Rapa Nui Landscapes of Construction Project
(LOC7)

Preliminary Multi-scalar Survey of the Southwest Section of the *Ara Moai* 2013

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Rapa Nui Landscapes of Construction

The Rapa Nui Landscapes of Construction Project (LOC) is funded by a grant from the Arts and Humanities Research Council in the UK. Based at the Institute of Archaeology, University College London, the project is directed by Sue Hamilton of UCL (principal investigator) and Colin Richards of the University of Manchester (co-investigator), in collaboration with Kate Welham of Bournemouth University (co-investigator). The University of the Highlands and Islands (Project Partner) is represented by Jane Downes.

On the Island, LOC works with Rapanui elders and students and in close cooperation with the *Corporacion National Forestal* (*CONAF*), Rapa Nui, and the *Museo Antropológico P. Sebastián Englert* (*MAPSE*).

The main aim of the project is to investigate the construction activities associated with the Island's famous prehistoric statues and architecture as an integrated whole. These construction activities, which include quarrying, moving and setting up of the statues are considered in terms of Island-wide resources, social organisation and ideology.

The Project is not just concerned with reconstructing the past of the island, but is also contributing to the 'living archaeology' of the present-day community, for whom it is an integral part of their identity and their understanding and use of the island. LOC is working with the Rapanui community to provide training and help in recording, investigating and conserving their remarkable archaeological past. Fieldwork between 2008 and 2013 was undertaken under a permit issued by the *Consejo de Monumentos Nacionales*, Chile (ORN No 1699 CARTA 720 DEL 31 del 01.2008).

January/ February 2013

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Preliminary Multi-scalar Survey of the Southwest Section of the *Ara Moai* , 2013

by Sue Hamilton

1. Introduction

The work described below was undertaken in collaboration with *CONAF*, in response to the prioritised needs of the Rapa Nui National Park and according to a timetable submitted to *CONAF* in December 2012. This report provides the first detailed documentation, using multiple scales of evidence and analysis, of the Hanga Tetenga-Rano Raraku section of the southwest branch of the *Ara Moai*, the suggested *moai* road network of Rapa Nui (Easter Island). This section of the *Ara Moai* is situated between approximately 06672/ 69972 (Ahu Hanga Tetenga) and 06694/ 69982, close to the base of Rano Raraku. Using the results of our work we suggest priorities for conservation and heritage management of the *Ara Moai*, and give proposals for the effective presentation of the archaeology of the *Ara Moai* to the public in a manner that is both informative and protective of the archaeological environment. Our results also suggest new lines of interpretation. This is an initial evaluation and we conclude by making suggestions for future, continued documentation, conservation monitoring and analysis of the archaeology of the *Ara Moai* and its preservation. No other section of Rapa Nui's so-called statue roads has been so extensively characterised.

2. The priorities of the Rapa Nui National Park

Our work focuses on a world-recognised part of the heritage of *moai* monumentality and transportation that has previously had only piecemeal work and documentation. Our work was undertaken in January 2013 and directly responded to the National Park's priorities and needs by:

- *Providing documentation and scientific characterisation*. We have undertaken integrated GPS mapping, 3D-photographic recording, geophysical survey and on the ground characterisation and documentation of the Hanga Tetenga-Rano Raraku section of the *Ara Moai* and its associated archaeology. We have provided this as an integrated digital database.
- *Establishing the state of preservation and the conservation priorities* of the 16 so-called 'transit' *moai* in this section. These statues are in variable and often poor condition and the National Park wishes to make well-informed decisions on their conservation priorities. Our work allows them to do this.
- *Providing and developing methods for continued conservation monitoring and protection of moai.* In conjunction with *CONAF*, we have isolated key attributes of *moai* weathering, and other threats to their preservation, which can be monitored effectively and systematically. We have undertaken field observation and 3-D photographic

recording of the 16 *moai* and made suggestions relating to their conservation priorities.

- *Isolating contexts for the controlled development of heritage tourism on the island* in a manner that will contain any potential threat to the island's archaeology. We provide an informed statement of the potential to develop the Hanga Tetenga–Rano Raraku section of the *Ara Moai* as a tourist heritage trekking trail.

3. Objectives of the survey

The objectives were:

1) To investigate and clarify the evidence for the route of the *Ara Moai* between Hanga Tetenga and Rano Raraku.
2) To record, describe and quantify the contexts and condition of the *moai* associated with it.
3) To isolate the primary current threats to the preservation of these *moai*.
4) To suggest conservation priorities.
5) To suggest methods for continued monitoring of the condition of *moai* along the *Ara Moai.*
6) To document and describe the associated/ proximate archaeological features along this route.
7) To generate information that can aid the interpretation of the *Ara Moai* and its associated *moai*.
8) To suggest the most effective way of creating a tourist trekking trail along the southwest section of the *Ara Moai* that is informative and at the same time does not threaten the archaeology of the *Ara Moai.*

4. Background to the archaeology of the *Ara Moai*

The first recorded sighting of the southwest *Ara Moai* was by Katherine Routledge (1919, 194). It appeared to her as a feature that was slightly raised over lower ground and depressed across higher ground. She had already considered the likelihood of an arrangement of roads over the island, which would account for the many Rano Raraku *moai* across the island, when late on a sunny afternoon towards the end of her stay, she saw the 'southern road' from the top of an unnamed hill (probably *Maunga* Toa Toa) two miles west of Rano Raraku.

Since then, high-resolution satellite photographs have revealed an extensive network of tracks leading from the statue quarry off to the ceremonial platforms (*ahu*) on which statues were set (Lipo & Hunt 2005). Image *ahu* (*ahu* with statues) line the coastline, but there are also inland examples that are accommodated by these tracks. Using this satellite imagery, Lipo and Hunt (2005) identified seven major roads on the ground

totalling 37 km, which correlated with 'road-side' recumbent statues, vegetation differences, depressions filled with cobble sized-scree, erosion hollows, surface evidence of a stretch of road kerbing and evidence from the excavation of several sections of the south-west road (Love 2001). Lipo and Hunt's work (2005) suggests a minimum of four major roads leading north-northwest, northwest, west-southwest and southwest from Rano Raraku (*Figure 1*). A fifth road may egress directly north from the quarry. From historic times down to the present, these tracks have served as horse trails, and cart and trekking routes, variously over and through rugged terrain, rock-strewn plots and areas of dense scrub. The antiquity, structural consistency — or otherwise — and associated architecture of the roads across this suggested network needs detailing, particularly with respect to the history and contexts of the recumbent 'roadside' *moai*.

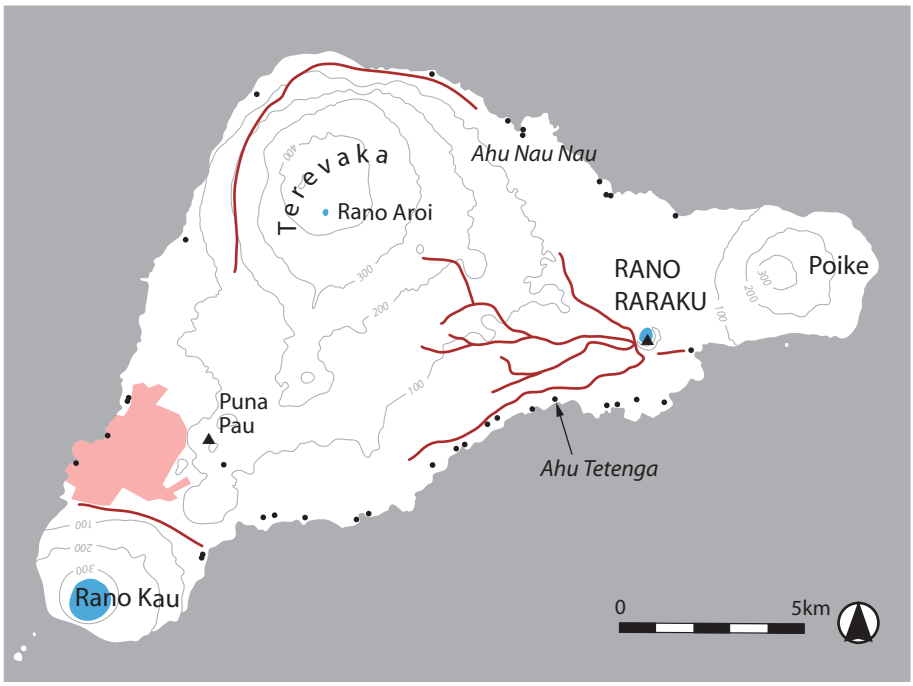


Figure 1.
The dendritic system of Rapa Nui's 'statue roads' from/to Rano Raraku (after Lipo & Hunt 2005)

In order to understand these 'road-side' *moai*, the Routledge team (1919) undertook several excavations. One of these, on a partially buried head two miles from Rano Raraku, revealed a pit in which the *moai* had perhaps once stood, indicating to her that rather than being abandoned 'in-transit', it and the recumbent *moai* had formerly been set up alongside the roads (*ibid.*, 195-6). The locations of these excavations were not identified in the 1919 publication but a possible candidate for the former lies a few hundred metres north of Ahu Runga Va'e, where a tilted *moai* remains half buried in a open pit, and another — probably not the excavation described — just west of Rano Raraku, where a prone *moai* is flanked by a pit and a spoil heap (LOC survey no 106) (*Table 1*). Routledge provides a vivid account of the approach to Rano Raraku with at least 'three magnificent avenues, on each of which the pilgrim was greeted at intervals by a stone giant guarding the way to the sacred mountain' (Routledge 1919, 196). This

idea was later superseded by the popular view that the recumbent statues were abandoned in transit, a perspective first proposed by Skjölsvold who stated that 'the bulk of the evidence would seem to indicate that the casually deposited statues along the ancient island tracks were abandoned in the course of transportation from the image quarry to their intended *ahu*' (Skjölsvold 1961, 379). Currently, the *Ara Moai* are presented as being primarily built for, or as having has the sole purpose of, transporting statues away from the main statue quarry of Rano Raraku (e.g. Love 2001).

To Lipo and Hunt (2000), the bifurcating pattern of the roads as they run out from Rano Raraku reflects the varied routes that statues took to individual *ahu* across the island. From this they infer that access to the quarry was by small, independent social groups. Our recent work has suggested the alternative explanation that the pattern of the roads and their associated *moai* are as much about going to Rano Raraku as the transportation of statues away from the quarry (LOC 2012).

Figure 2.
Circular 'stone platform' uncovered at the base of Heyerdahl's moai *473 (LOC survey no 103)*
© Kon-Tiki Museum, Oslo

Excavation by Thor Heyerdahl and Arne Skjölsvold in 1986 of two *moai* along the southwest road (Heyerdahl *et al*. 1989) (Heyerdahl's *moai* 478 and 504; LOC survey nos 103 & 116) suggested the possible presence of statue platforms behind them. Excavation around one (LOC survey no 116) was inconclusive, although a 'very hard packed' layer was encountered in a discrete area directly behind it (*ibid*. 55). But that of the other (LOC survey no 103), which lies near the end of the south-west road, adjacent to the present-day wall surrounding the Rano Raraku quarry uncovered a circular stone platform at the base of the fallen *moai* (*Figure 2*), lent 'support to the

assumption by Katherine Routledge that the statues at one time stood on the very spot where they at present lay' (Heyerdahl *et al*. 1989, 56), although this did not produce an overall concession to the idea of 'transit statues'. Recent geophysical (resistivity) work by the LOC team (LOC 2012) on the locations of the recumbent *moai* on the southwest section of the *Ara Moai* also suggests the possibility that these statues were originally upright monuments that marked a ceremonial route to Rano Raraku. Here, prospection in the vicinity of the recumbent *moai* (*Table 1*) suggested further evidence of stone plinths adjacent to the statues congruent with the idea that the statues originally were set up as monuments along the southwest *Ara Moai*. This section of the *Ara Moai* is the first/ final part of the road away from/ into Rano Raraku, which adds to its importance and interest and the significance of such interpretation.

The study of all of these issues is informed by the present survey. Our recording of differential weathering patterns on *moai* along the Hanga Tetenga–Rano Raraku section of the *Ara Moai* can be considered in the light of what would be expected on either upright or recumbent statues and can inform consideration of the idea that they were originally standing. The additional geophysical work in the vicinity of the statues also contributes to our understanding, not only the route but also the existence — or otherwise — of the formality/ architecture of the *Ara Moai*. Concurrent characterisation of the associated archaeology of the south-west section of the *Ara Moai* adds a wider perspective on the context and meaning of journeying along the road to and/ or from Rano Raraku and the activities that occurred alongside the road during the statue period and through to historic times.

Likewise, since the first Norwegian Expedition (Heyerdahl & Ferdon 1961), much debate has focused on how *moai* were moved. The numerous ideas and experiments include: on their back on a wooden sledge without rollers, rocking in an upright sledge, upright walking and tilting side to side, upright in a sledge with rollers, and horizontally in a sledge with rollers (Heyerdahl *et al*. 1989; Hunt & Lipo 2011; Love 1990; 2000; Pavel 1995; Van Tilburg 1996). Analysis of the state of preservation of the statues adds contextual information to these debates by systematically noting mechanical abrasion/ polish and broken-off areas of the statue surfaces.

5. Ground-based field walkover survey and mapping

Introduction

The aim of the walkover survey was to identify, describe, photograph and geo-reference (and later, GIS map) the *c.* 2 km of the southwest section of the *Ara Moai* between Hanga Tetenga and Rano Raraku. Our particular focus was the form, preservation and relationships of the archaeological features comprising and immediately associated with it. In studying and documenting *Ara Moai* in this way, we hoped to place it more clearly both in a landscape and wider archaeological context, and in so doing make it accessible both for interpretative and presentational purposes, and to isolate conservation priorities. This was a preliminary 14-day survey.

Method

The suggested route of the *Ara Moai* in its southwest section is that identified by Lipo and Hunt's satellite imagery (*Figure 1*). The route today, which is considered to have antiquity because it links the recumbent *moai*,

LOC survey no(s)	Atlas Number	Resistivity	Presence of Platform	Visible stones at base	Previous excavation	Notes
102	RR-117	Yes	No	No	Possibly	Resistivity shows sub-surface disturbance
103	13-477	No	Yes	No	Heyerdahl 1986	None
104	13-478	Yes	Unknown but area of low resisistance at base of statue	No	Possibly	Traces of possible excavation trench. Bedrock visible *c.* 7m behind base.
105	13-481	Yes	Yes – resistivity & observation	Yes	Unknown	Semi-circle of buried stones projecting through surface at base
106	13-485	Yes	Unknown	No	Routledge 1914?	Hollow behind base of statue — many substantial stones in upcast
107-9	13-486	No	Unknown	No	Unknown	Not surveyed
	13-487	Yes	Yes – resistivity uncertain & observation	Yes	Unknown	Stones projecting through surface at base of statue. Resistivity shows ambiguous off-centre anomaly
	13-488	No	Unknown	Yes	Unknown	General spread of stones at base
110-12	13-490	No	Unknown	Yes	Unknown	
	13-491	No	Unknown	Yes	Unknown	
	13-492	Yes	Yes – resistivity	Yes	Unknown	Wide spread of stones at base
113	13-509	Yes	Unknown	Yes	Unknown	Probable later stones at base of statue
114	13-177	Yes	Yes – resistivity	No	Unknown	None
115	13-96	Yes	Unknown	Yes	Unknown	*Manavai* cell (not a plinth) abutting base
116	13-52	No	Unknown	No	Heyerdahl 1986	Compressed area at base of statue
117	12-30	Yes	Yes – resistivity	No	Unknown	None
120	12-13	Yes	Yes – resistivity & observation	Yes	Unknown	*Moai* in modern garden plot
121	12-14	No	Yes – observation	Yes	Unknown	
122	12-172	No	No	No	Unknown	Fragment of *moai* – probably displaced
123	12-220	No	Uncertain	Yes	Unknown	*Moai* lying in a stone-lined cut in slope
124	12-255	No	*ahu*	N/A	Love 2001	None
125	12-397	No	Uncertain	No	Vargas *et al.* – nd.	None
n/a	12-452	No	Uncertain	No	Unknown	Not surveyed

Table 1.
Evidence for 'statue plinths' along the Ara Moai

exists as a rutted hollow at the Hanga Tetenga end and a worn path through dense scrub between Toa Toa and Rano Raraku. In the vicinity of Toa Toa it is unclear. The existing path circuits the hill to the north but the most likely route of the *Ara Moai* takes in a recumbent *moai* to the south — at the foot of the hill — and it is this that we used for our documentation. Our walkover sought out, described/ assessed and mapped all visible archaeological features for 20 m either side of it (*Figure 3*). Beyond this, only groups of related and highly visual features such as *ahu* that may have had significance to the activities of the route and the experience of travelling along it were recorded. Features were geolocated using handheld Garmin *Etrex* GPSs and logged-in on a standardized prompt-led recording sheet (*Appendix 1*).

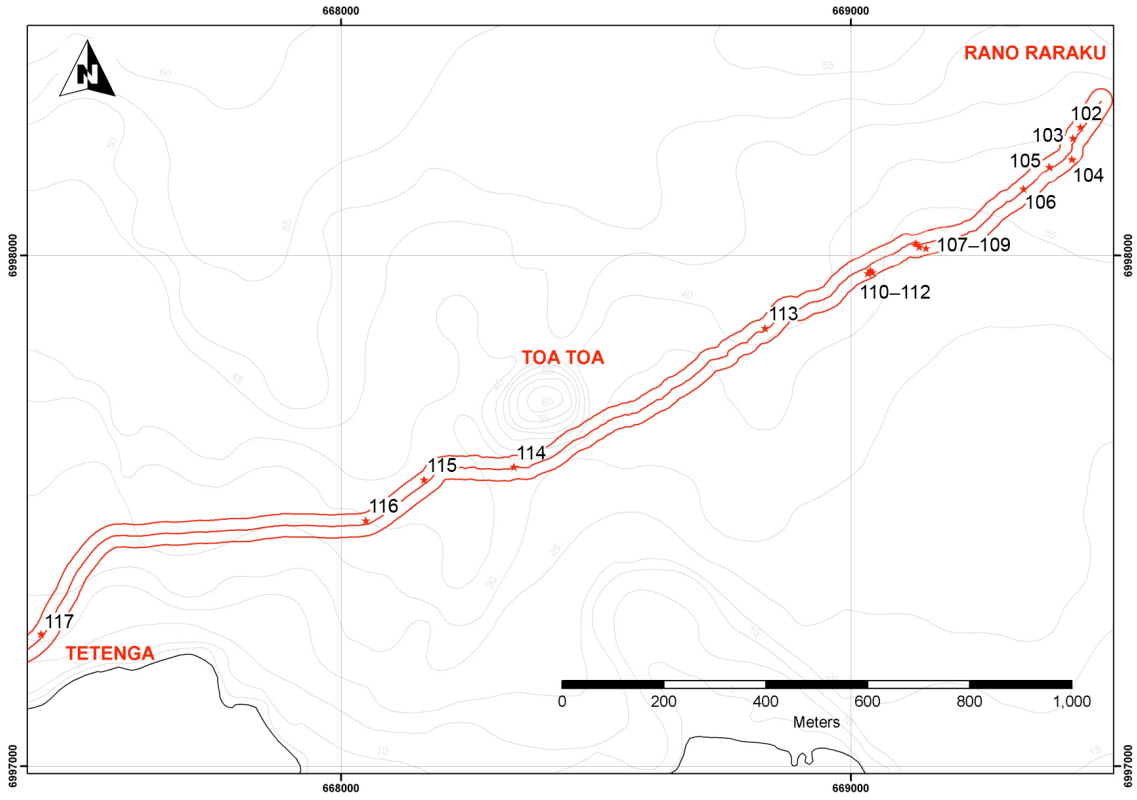


Figure 3.
The Ara Moai *and its associated statues (LOC survey nos)*

Large parts of the *Ara Moai* and the 20m-survey strip either side of it were not viable for walk-over survey due to the dense grass and scrub cover (*Figure 4; Appendix 2*). For these areas, we have noted large upstanding, highly visual features but many smaller, lower features such as *hare paenga* (e.g. *Figure 5*), *umu* and sunken *manavai* will certainly have been missed, a fact reflected in our distribution maps (*Figures 13–18*). *CONAF* undertook clearance for several meters around each recumbent *moai* to enable their conservation study (see below). In some cases this localised clearance revealed previously obscured archaeological features, which were also mapped and documented as part of our survey (*Figure 7*). These cleared areas provide an indication of the potential density of currently unknown features along the grass and scrub obscured stretches of the *Ara Moai*.

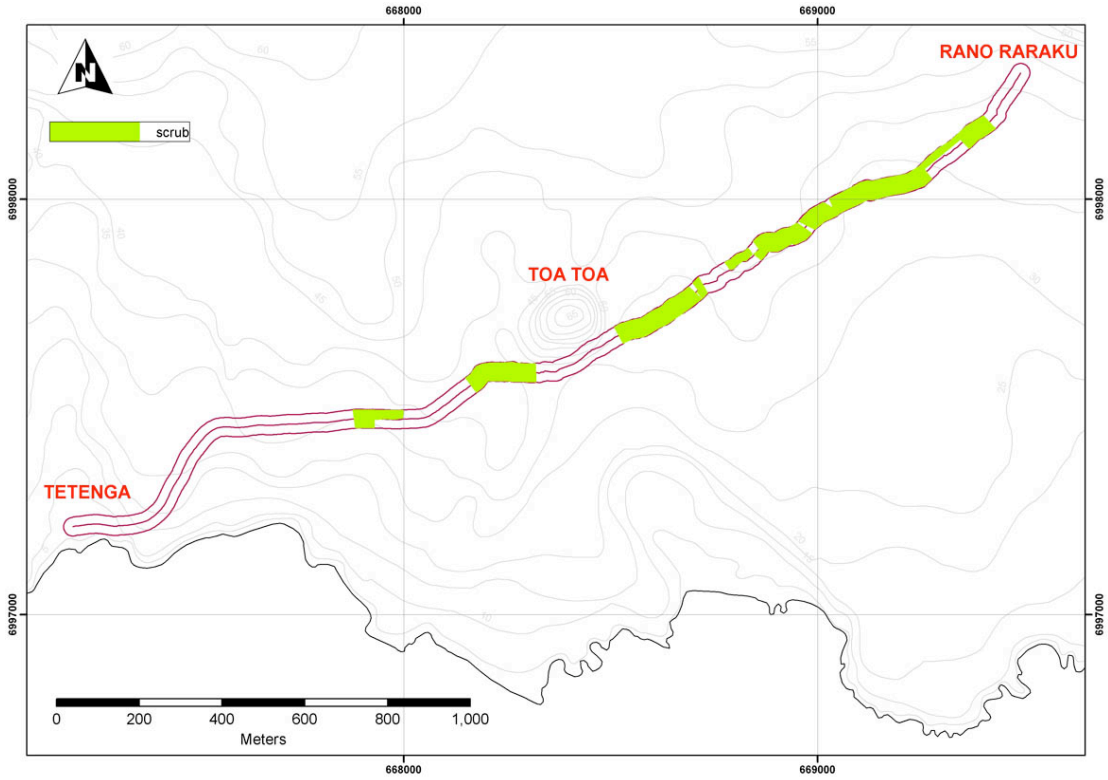


Figure 4.
Stretches of the Ara Moai *impossible to survey due to the dense scrub cover*

Figure 5.
Hare paenga *at the foot of Toa Toa. At barely 20cm high, it is mostly hidden by scrub*
(LOC survey no 53)

The GIS mapped features were divided by feature-type. In the present survey these were:

- *Ahu* (1)
- *Avanga*/ *hare moa* or chicken house (11) (*Figures 6 & 8*)
- *Hare paenga* (10) (*Figures 5 & 7*)
- Possible *ahu* (2)
- Cave in feature complex (1)
- Cave cairn (2)
- Enhanced cave (3)
- Crematorium (1)
- Line of stones (2)
- *Manavai* (13) — the differences between raised and sunken *manavai* and *manavai* complexes are noted in the database comments (*Figures 8, 9 & 16*)
- *Moai* (16)
- *Paenga* — isolated (1)
- Pile of stones (4)
- *Poro* pavement (6)
- Propped stone (1)
- *Pu paenga*(s) — isolated (1)
- Quarry — minor (9) (*Figure 10*)
- *Umu* (21) (*Figure 11*)
- Road feature — upcast (2)
- Slipway (1)
- Unidentified stone structure (2)
- *Taheta* (2) (*Figure 12*)

These were tabulated in an Excel relational database that can be used to produce GIS generated distribution maps (e.g. *Figures 13–15*) (*Digital Appendices 2 & 5)*. The documented database includes photos of each feature produced by pole-mounted and handheld cameras (*Digital Appendix 6*). These photographs and datasheets and GIS links are digitally stored and deposited with *CONAF* and *MAPSE*.

Results

In addition to the 16 *moai* associated with the Hanga Tetenga–Rano Raraku stretch of the *Ara Moai*, 101 features were identified and mapped by the survey (*Figure 13*). A wide, very typical range of feature types and suites were identified. These are similar to what is found in many other parts of the Rapanui landscape (e.g. Stevenson & Cristino F. 1986; Vargas *et al*. 2006). The most recurrent features were: *umu* (20.8%), *manavai* (12.9%), *hare*

Figure 6.
Well-preserved hare moa *or chicken house*
(LOC feature 99)

Figure 7.
Well-preserved hare paenga *in an area freshly cleared of scrub. Cf. Figure 6*
(LOC feature 91)

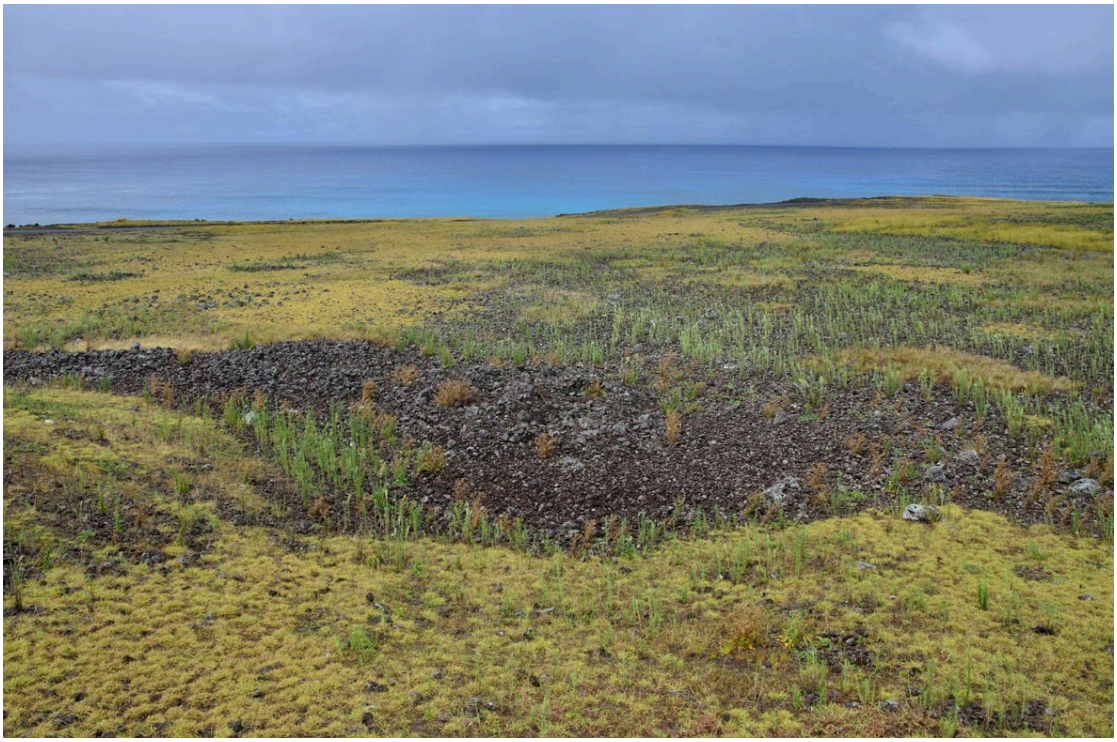


Figure 8.
Raised manavai *complex*
(LOC feature no 9)

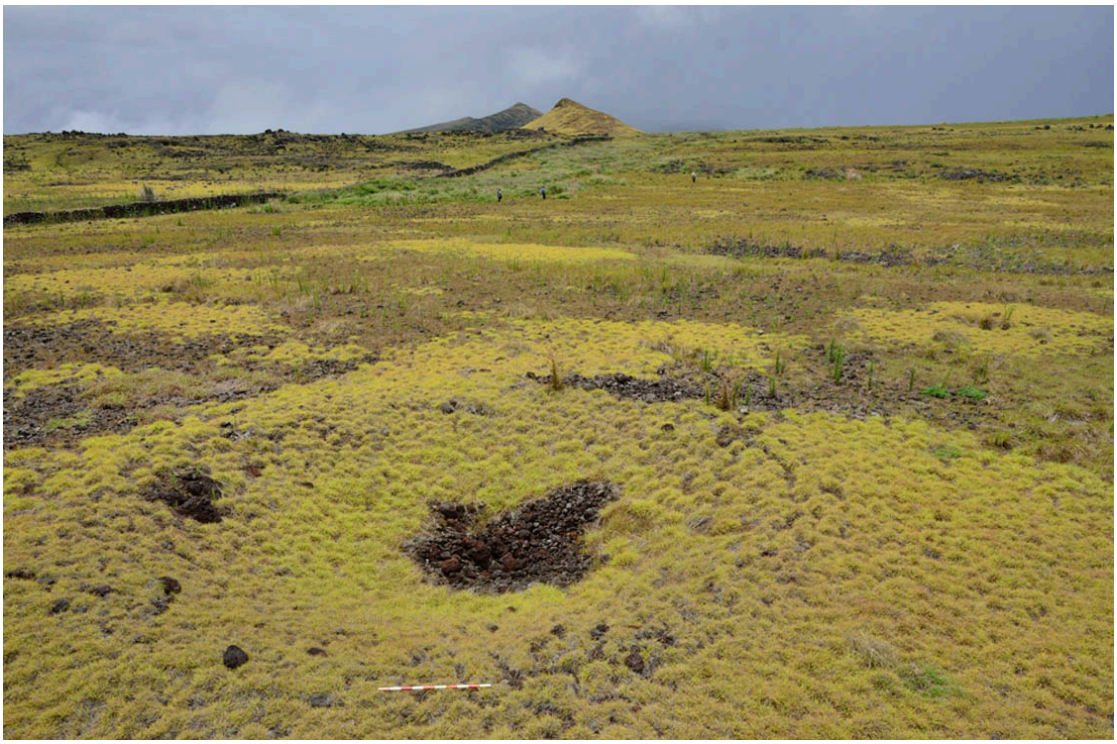


Figure 9.
Sunken manavai
(LOC feature no 19)

Figure 10.
Minor quarrying. The unnaturally angular morphology of the stone and the way the left-hand joint is packed with small stones is indicative of quarrying
(LOC survey no 81)

Figure 11.
Umu
(LOC survey no 76)

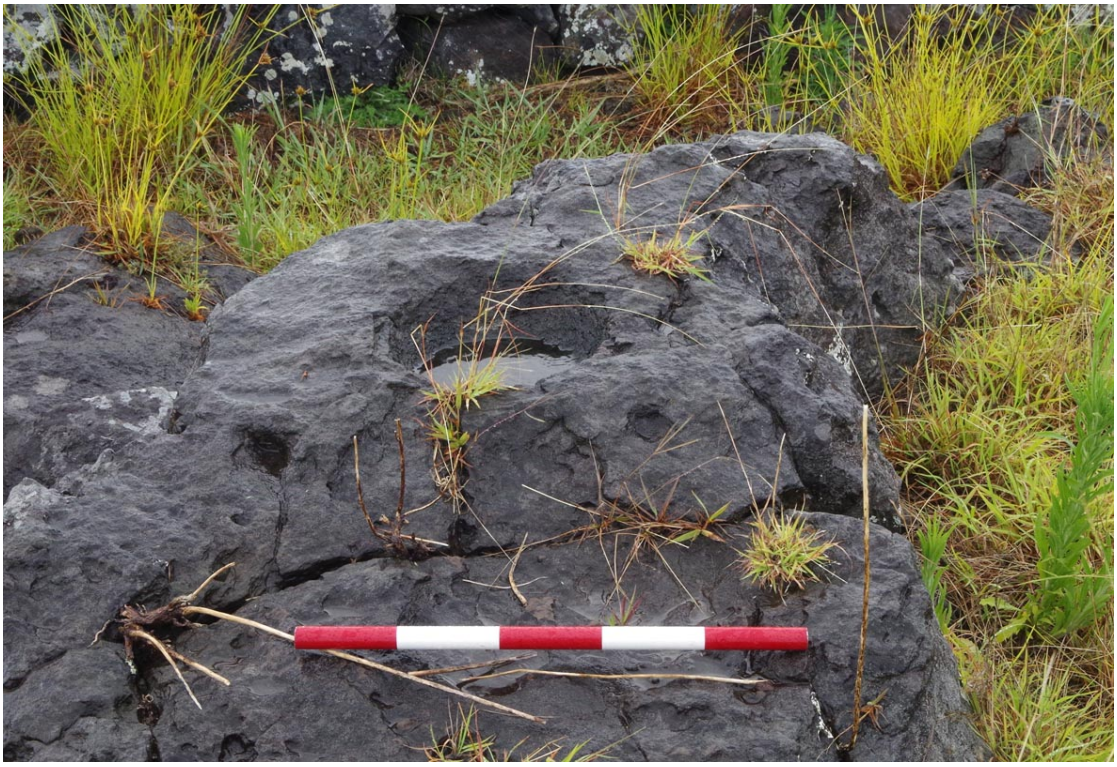


Figure 12.
Taheta
(LOC survey no 17)

paenga (9.9%), minor quarries (8.9%), *poro* pavements (5.9%) and caves (5.9%). Of these 28% were considered of high significance because of their close proximity to the *Ara Moai*, because they were well-preserved, because they formed part of a complex of related features and/ or they were significant monuments (e.g. *ahu*), which would have been highly visible from the *Ara Moai*. The 24% of features that were identified as of low significance mostly lacked associations or were poorly preserved. The remaining 48%, though largely typical of their feature category, were categorised as of medium significance because they lacked meaningful feature associations.

The *Ara Moai* here has few structural characteristics to confirm its antiquity as a route. Only two possibilities were noted, both at the Hanga Tetenga end, where it follows a hollow from which soil and stone appears to have been upcast (LOC survey nos 6 & 7). This upcast is *overlain or abutted* by agricultural rock mulch. If the former, this would suggest that the cutting is of antiquity. Dense scrub marking much of the route of the *Ara Moai* between Toa Toa and Rano Raraku is likely to be the product of long term human and animal traffic, which has created water retentive ruts filled with stone scree and enriched with animal scat. The longest stretch of the *Ara Moai* as a depression is between Hanga Tetenga and close to Toa Toa, where it runs along an extant ranch boundary (see Porteous 1981, 141-8). This will have focused wear on this part of it since at least the early/ mid 20th century.

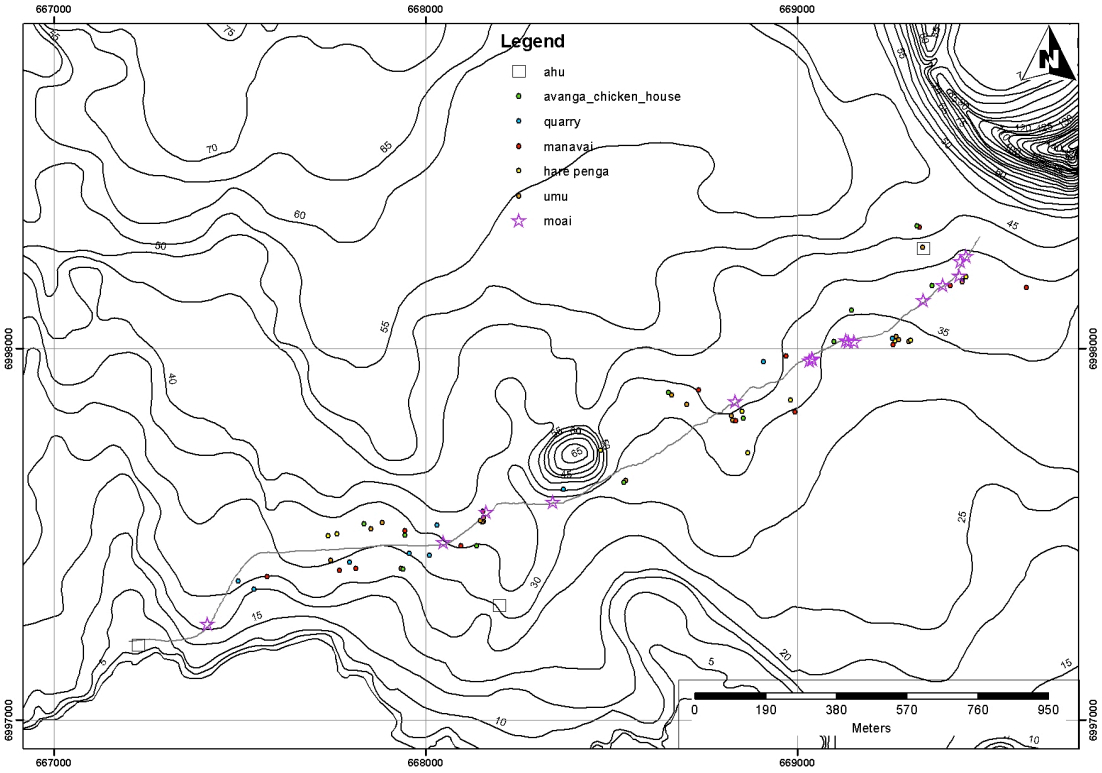


Figure 13.
The distribution of recumbent moai *(stars) and other archaeological features in the survey area*

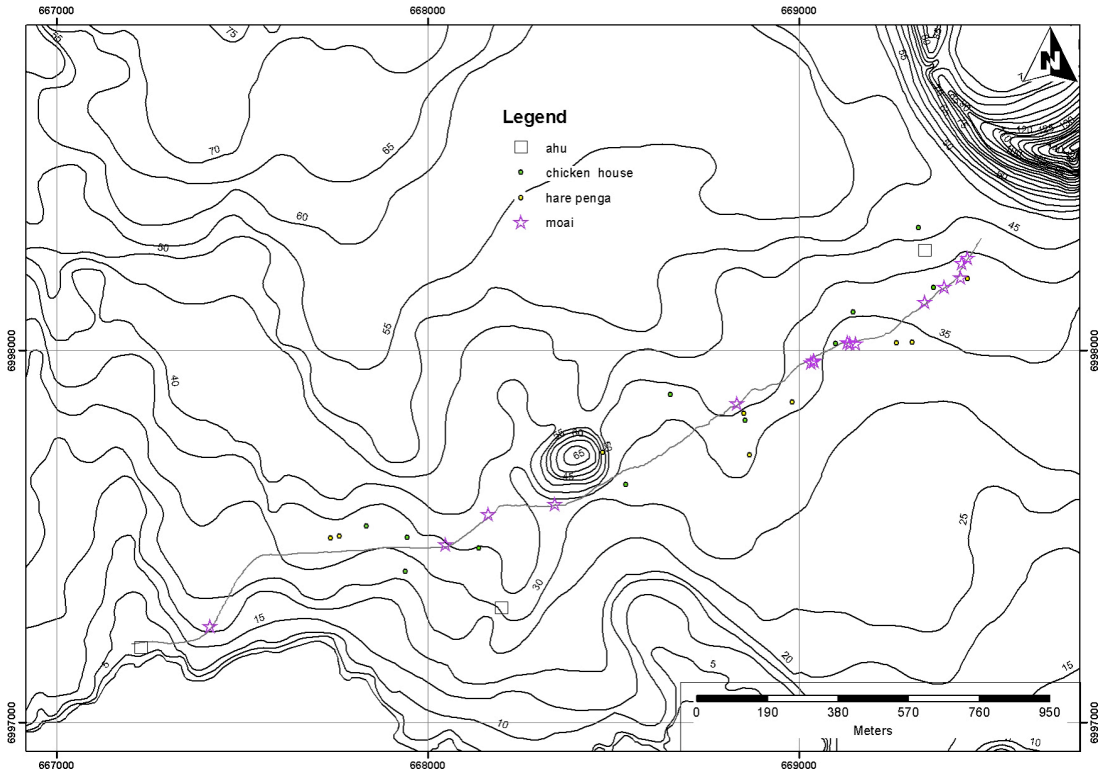


Figure 14.
Distribution of hare paenga *(boat-shaped houses) and* hare moa *(chicken houses) in the survey area*

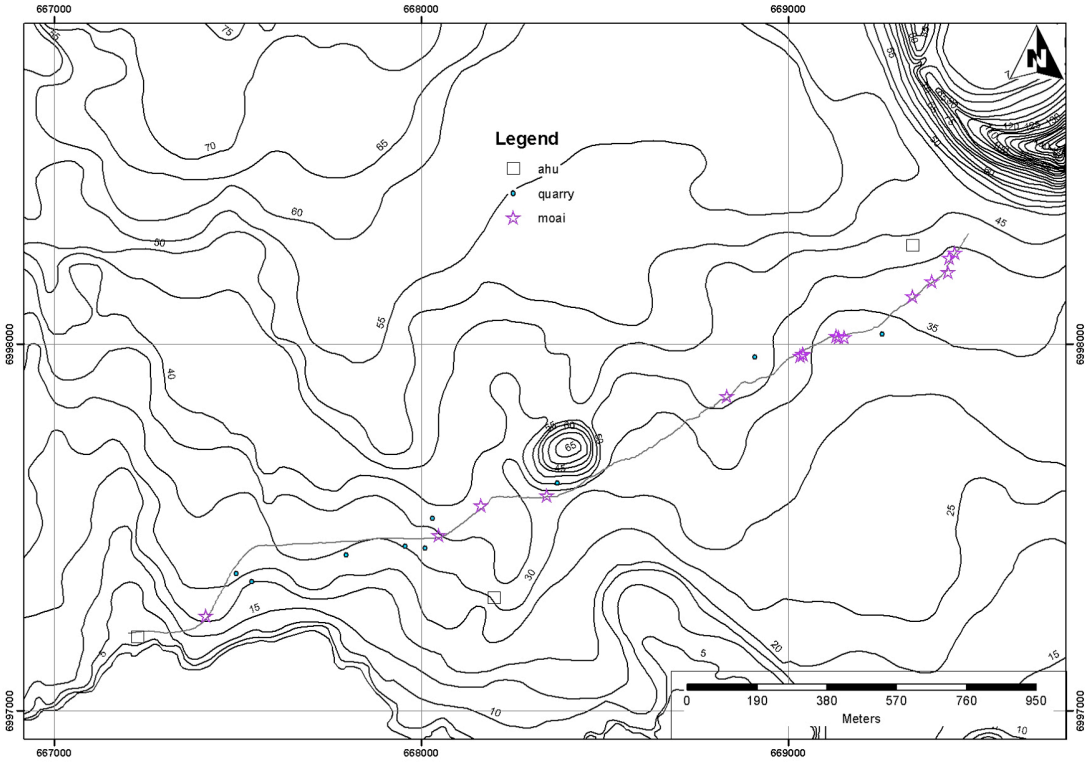


Figure 15.
Distribution of minor quarries in the survey area

The fact that the types of features found in the vicinity the *Ara Moai* are the same as those present in other places on the island suggests that it did not impose an environment of sacred/ exclusionary space beyond the precise boundaries of its route and that contemporary and subsequent daily life abutted it. The fact that agricultural rock mulch abuts and runs alongside it on both it sides for most of its length strongly supports this argument. There are recurrent feature suites: notably *hare paenga* with *umu* and chicken houses (e.g. LOC survey nos 60–62, 65 and 66) (*Figure 14*). The route of the *Ara Moai* passes between numerous minor stone quarries (e.g. LOC survey nos 8, 18, 28, 73 and 81) (*Figures 10 & 15*), with most major rock outcrops along this part of it having had stone deliberately removed, for building or use in rock mulching. The route to/ from Rano Raraku therefore passed through a landscape of intense stone garnering. The chronology of features on either side of the road is mostly impossible to ascertain due to the lack of physical associations between features. The occurrence of *manavai* complexes and structures subsequently built around and against recumbent *moai* (LOC survey nos 113 & 115), however, indicates that they eventually lost any physical form of sanctity or, on the contrary, that after they fell or were abandoned people continued to believe that their special properties could exert some power through physical association (*Figure 16*).

A study of the distribution of *moai* and their topographic contexts along the Tetenga–Rano Raraku section of the *Ara Moai* suggests certain characteristics of the route. The recumbent *moai* are spaced unevenly. At the Tetenga end they are widely spaced. Here the route is dominated by the presence of Toa Toa, which looms larger than and increasingly obscures any

Figure 16 .
Moai *directly associated with collapsed* manavai (foreground) *and* hare moa
(LOC survey nos 46 & 115)

view of Rano Raraku. Before reaching Toa Toa, it traverses two ridges. One *moai* (LOC survey no 116) is 'false-crested' on the second of these; the next (LOC survey no 115) on the top. Beyond Toa Toa with increasing proximity to Rano Raraku the *moai* occur at shorter intervals, first in two intervisible clusters of three and then a series of more closely spaced single *moai*. The journey beyond Toa Toa is dominated visually by Rano Raraku. In terms journeying along the road towards Rano Raraku this creates an intensity of monumentality, which would have been all the more dramatic if the statues had originally been standing.

In due course more detailed study of *Ara Moai* viewscapes should characterise journeying along it in the Rano Raraku to Hanga Tetenga direction. The *Ara Moai* should be considered as something that facilitated an experiential journey — as it does today — as well as a mechanism for allowing the movement of statues to various locations around the Island.

There are several distinct topographies and key features/ monuments that would have marked the journeys along the *Ara Moai*. Maunga Toa Toa, already mentioned, marks approximately the halfway point between Hanga Tetenga and Rano Raraku. The hill is a visually distinctive feature with vivid exposures of red earth on its flanks and a cap of tuff similar to that comprising Rano Raraku. There is evidence of quarrying, possibly for red pigment on the hill and it may have had an ideological or special significance due to this (LOC survey no 87). Likewise, the positioning of Ahu Puoko (LOC survey no 98) — very proximate to the *Ara Moai* at the base of Rano Raraku and facing towards Rano Raraku — may have been of some conceptual importance in relation to the activities along the road at an important point of entry and egress to and from the *moai* quarry. This *ahu* is in a ruinous

state with larger and smaller pieces of several broken *moai* scattered around the feature and with little clear visible evidence for its platform remaining. On the Rano Raraku side of the feature there is a *poro* ramp that appears to be substantially complete, but this is mostly obscured by grass and low scrub. Ahu Hanga Tetenga at the Hanga Tetenga end of the *Ara Moai* (LOC survey no 1) forms the monumental conclusion of the road in this section. The *ahu* is an impressive image *ahu* that was later converted into a semi-pyramidal *ahu*. It has a crematorium on its seaward side and here has suffered badly from sea erosion and structural collapse. On its west side there are also the remains of a paved 'slipway' to the sea (LOC survey no 3) (*Figure 17*) that is in imminent threat of destruction due to coastal erosion and human activity related to the use of a nearby water pump.

Figure 17.
'Slipway' in a ruinous state at Ahu Hanga Tetenga (LOC survey no 3)

Surveyors: Sue Hamilton, Francisca Pakomio, Mike Seager Thomas & Ruth Whitehouse
Photography: Mike Seager Thomas & Adam Stanford

6. Statue conservation survey

Introduction
There are 16 recumbent *moai* associated with the Hanga Tetenga–Rano Raraku section of the southwest *Ara Moai* (*Figure 3*). These *moai* are in variable states of preservation. The present study aims to isolate the characteristics and possible causes of this variability, make recommendations for their protection and suggest priorities that take into account their interpretative and presentational value.

Method

For the present study, *CONAF* cleared areas of vegetation proximate to the *moai* in order to allow us better to assess their surfaces and associated topographic and architectural environment. A conservation monitoring exercise was undertaken, which involved the development and use of a 'statue state of preservation of sheet' (*Appendix 3*). The documentation fields included basic information about the lying position of the statue:

- Prone; supine; on left side; on right side
- Inclination angle of each statue on the ground surface
- Alignment of each statue with respect to the statue road
- General trend of the bedding of each statue's geology with respect to the longitudinal access of the statue.

These are all factors that can affect the causes of, speed, and severity of weathering and damage patterns on the *moai*. The 26 fields that we isolated, in discussion with Susana Nahoe of *CONAF*, for observation, documentation and monitoring are as follows:

- Overall condition (loss of sculpted features)
- Weather related damage (gullying/ stone disintegration/ fissures/ cracks/ fractures/ cavities/ lamination).
- Other surface features (silica deposits/ salt efflorescence/ darkening due to humidity/ lichen, moss and other vegetation growth/ loose seeds/ bird excrement/ honey comb/ fire damage/ modern graffiti).
- Evidence of livestock or human damage (abrasion/ smoothed or polished areas/ parts broken off in recent times).
- Locational characteristics (sedimentation/ marine spray/ exposure to birds/ vulnerability to future damage by humans and animals).

The above listed factors were assessed and documented separately for each of six major surfaces on each statue: top of head, base, left side, right side, front, and back. Evidence for weathering and alterations to surface features were scored on a scale of 1 to 4 as follows: 1 = none; 2 = minor (<33.3% of the visible area); 3 = medium (33.3–66.6% of the visible area); 4 = major (>66.6% of the visible area). In the case of loss of features, the score relates to assessed degree of damage: 1 = none; 2 = minor; 3 = medium; 4 = major, rather than the percent of area covered by damage. The collected data is collated as an Excel worksheet that can be questioned to isolate patterns of deterioration, and levels of vulnerability (*Digital Appendix 4*). This data forms the basis of our present recommendations for monitoring and conservation priorities for the *moai* of the *Ara Moai*.

In addition to tabulating, through field observations, the characteristics listed above, multiple high-resolution photographs of each *moai* were taken by Adam Stanford of Aerial-cam to visually record the current condition of the 16 *moai* (*Digital Appendix 7*). These were additionally used to create 3-D models of each *moai* (e.g. *Figure 18*).

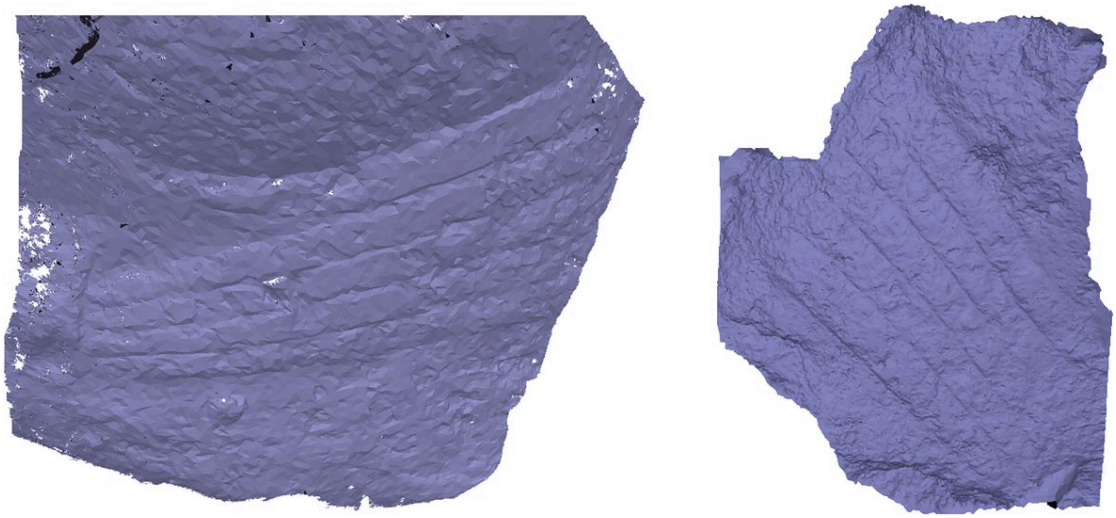


Figure 18.
3-D photographic models of well-preserved (left) and deteriorating moai *hands (right)*
(LOC survey nos 116 & 113)

This 3-D modelling produces a precise and highly visual record of the surface state of each *moai*: the most detailed record in existence. For the best results, 3-D imaging produces very large data files. For current ease of data storage by *CONAF* these have been reduced, for each *moai*, to a single image stored as a PDF (*Digital Appendix 8*). If this monitoring exercise is repeated — both the high-resolution photography and the 3-D modelling — at, for example, 5-year intervals, direct comparisons of any changes that occur in their condition will be possible.

Results

All of the *moai* along the *Ara Moai* are open to the elements and subject to ongoing climate related chemical and — to a lesser extent — physical weathering. In addition, our survey identified 13 (87%) as vulnerable to both human and animal activity. Three of the 16 *moai* were supine and the others prone. The most protected part in their current prone positions is the front, or when supine the back. However, the fronts of prone *moai* often show differential weathering of different parts such as the upper and lower eye, the chin, the chest/ upper stomach and the hands/ belt and lower belly: in most cases the upper eye, the chin and the hands/ belt and lower belly being significantly less weathered. This suggests that the weathering occurred while the *moai* was in a standing position with greater protection to these parts than the lower eye and the chest/ upper stomach. More detailed investigation of this would certainly contribute to the debate about whether these *moai* were originally set-up along the road or not. The most common weathering feature is gullying, caused by the differential weathering of the layers comprising the tuff, and it is associated with the greatest loss of features (*Figure 19*). Exposure to sedimentation and marine spray do not appear to be particularly problematic. *Taheta* on the backs of two *moai* have vegetation growing out of them; and potentially destructive lichen growth is widespread. The downward sides of statues often develop major salt efflorescence and darkening due to humid conditions and for prone statues

this can obscure delicate but otherwise well-preserved features such as the hands and belt. Damage by animals rubbing up against them is significantly present on statue bases (100%) (*Figure 20*) and shoulder areas.

Surveyors: Sue Hamilton, Mike Seager Thomas & Ruth Whitehouse.
Photography: Adam Stanford

Figure 19.
The heavily weathered back of a prone statue. The features are blunted by gullying (LOC survey no 103)

Figure 20.
Evidence for animal rubbing on the bases of two moai
(LOC survey nos 109 & 117)

7. Geophysical survey on the Southern *Ara Moai*, Rapa Nui

by Kate Welham

Introduction

The Ara *Moai*, or *moai* roads, are a network of tracks that originate from a common centre at Rano Raraku and spread out over the island towards the coastal *ahu*. Recumbent *moai* lie at intervals along them. As stated above, records from Routledge (1919), and excavations by Heyerdahl (1989) and Love (2001) have indicated that these 'roads' may be tracks at best and are likely to be shallow ephemeral features, possibly containing some compacted areas of soil. Some statues along the *Ara Moai* have been found to have sub-circular pads of stones near their base. Mapping using satellite imagery techniques (Lipo & Hunt 2005) has provided suggested locations for the network of *Ara Moai* across the island.

This geophysical survey was commissioned by *CONAF* to investigate the southwest *Ara Moai* between Hanga Tetenga and Rano Raraku (*Figures 1 & 3*) in advance of the possible creation of a heritage trail. The work forms part of a larger survey of the area, and the main aim was to determine if geophysical survey could identify evidence for the presence of the *Ara Moai*.

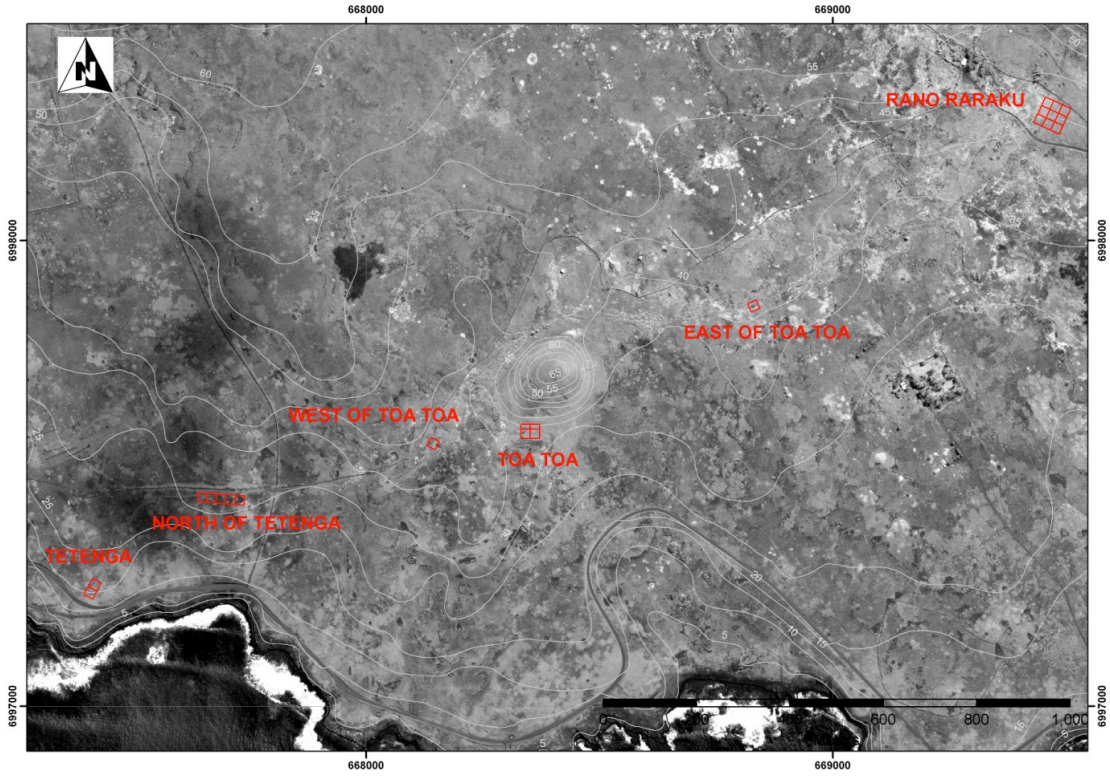


Figure 21.
The southwest section of the Ara Moai *from Hanga Tetenga to Rano Raraku showing the locations of the 2013 geophysical surveys*

Method

Geophysical survey was conducted at six locations along the southwest *Ara Moai* (*Figure 21*). Grids for geophysical survey were located using a Leica 500 differential Global Positioning System (dGPS) and data were downloaded and processed in Leica GeoOffice v.8.0, and converted to SIRGAS2000. Plans were produced in ESRI ArcGIS v10.0 using point data exported from Leica Geo

Office and base map layers provided by *CONAF*. All sites were surveyed using electromagnetic techniques and fluxgate magnetometer data were also collected where vegetation allowed. All grids were 20 m by 20 m.

The electromagnetic survey was conducted using a Geonics EM38B instrument in vertical and horizontal dipole modes. Readings were taken at 1m intervals along north-south traverses spaced 1m apart. Data were accessed in Geonics DAT software.

Fluxgate gradiometer survey was conducted using a Bartington Grad601b with readings taken at 0.125 m intervals along north-south traverses spaced 1m apart, at a resolution of 1nT, readings were taken in parallel. All data were subjected to minimal processing (e.g. despike, zero mean traverse, and clip) in Archeosurveyor v2.5, and imported into ArcGIS v10.0 for display and production of interpretation plots. The data are presented in Figures 22-9.

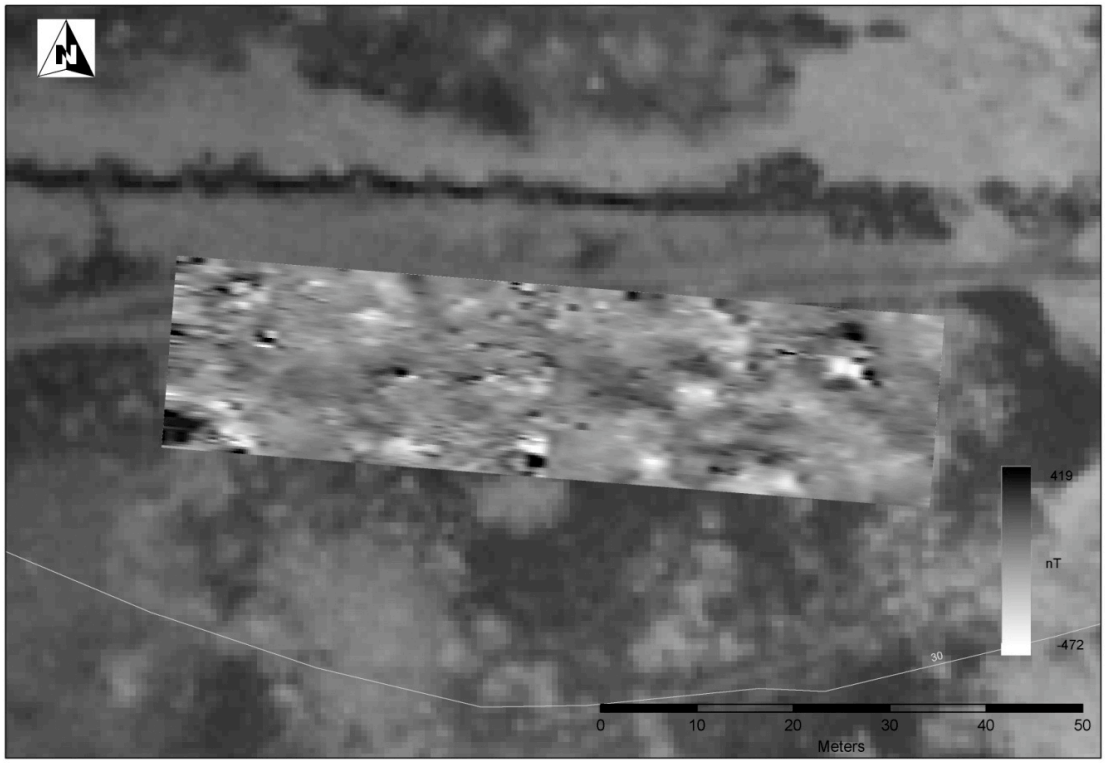
Results

North of Hanga Tetenga

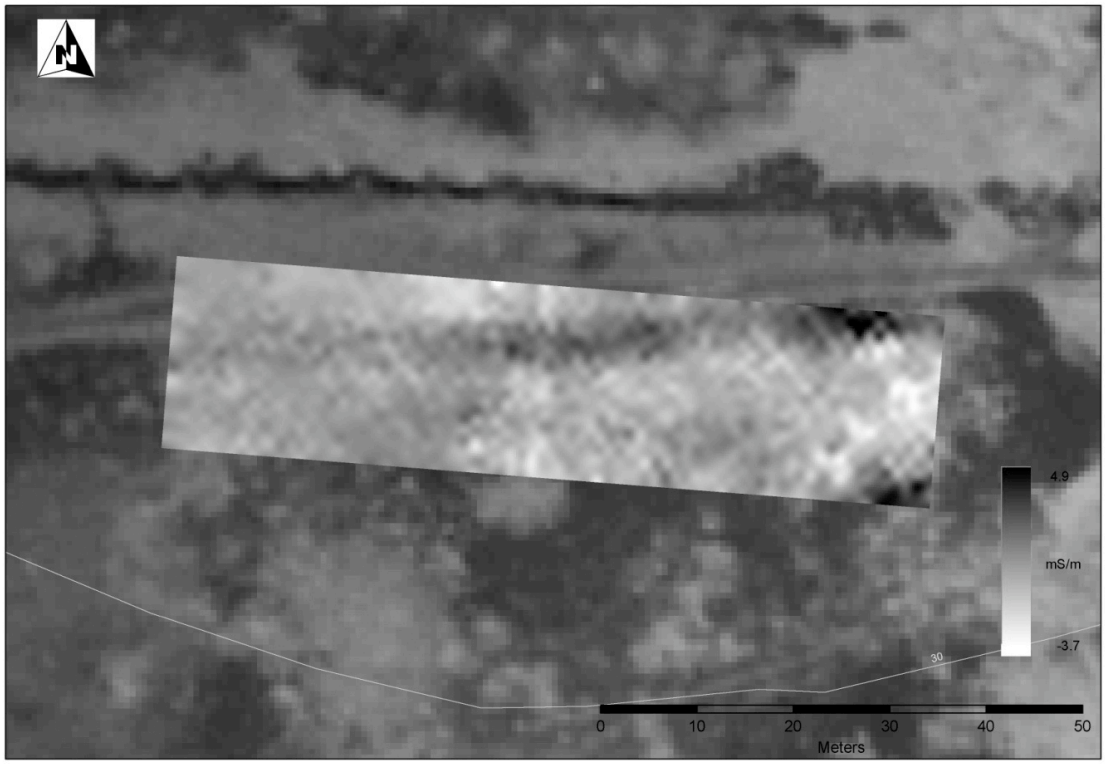
In order to establish whether the magnetic techniques were suitable for survey on the *Ara Moai*, a test site was used across the visible trackway that runs in an east-west direction just up the hill from Ahu Hanga Tetenga (*Figure 21*). This site was selected as the trackway/ putative *Ara Moai* is visible here and the ground was relatively flat and vegetation free. Electroconductivity survey in vertical mode, and fluxgate magnetometer survey were conducted. The results are presented in Figure 22.

Fluxgate magnetometer survey was extremely difficult due to the rocky nature of the terrain, and the presence of large swathes of rock mulch. The data obtained do not give a clear indication of the presence of the trackway and it is thought likely that the depth of any anthropological activity may be too shallow and/ or ephemeral to be effectively identified using this technique. The presence of significant quantities of basaltic boulders/rocks, and outcrops of basaltic bedrock is also thought likely to have provided interference in the survey.

The electroconductivity survey produced a successful conductivity survey that clearly indicates the path of the visible trackway. The results of the magnetic susceptibility survey are not reported here as the higher apparent magnetism of the basaltic bedrock and soils in this area gave readings beyond the scope of the data logger. This was resolved by adjusting the gain for all future surveys.



A: Fluxgate magnetometer data



B: Electromagnetic survey data: conductivity (vertical mode)

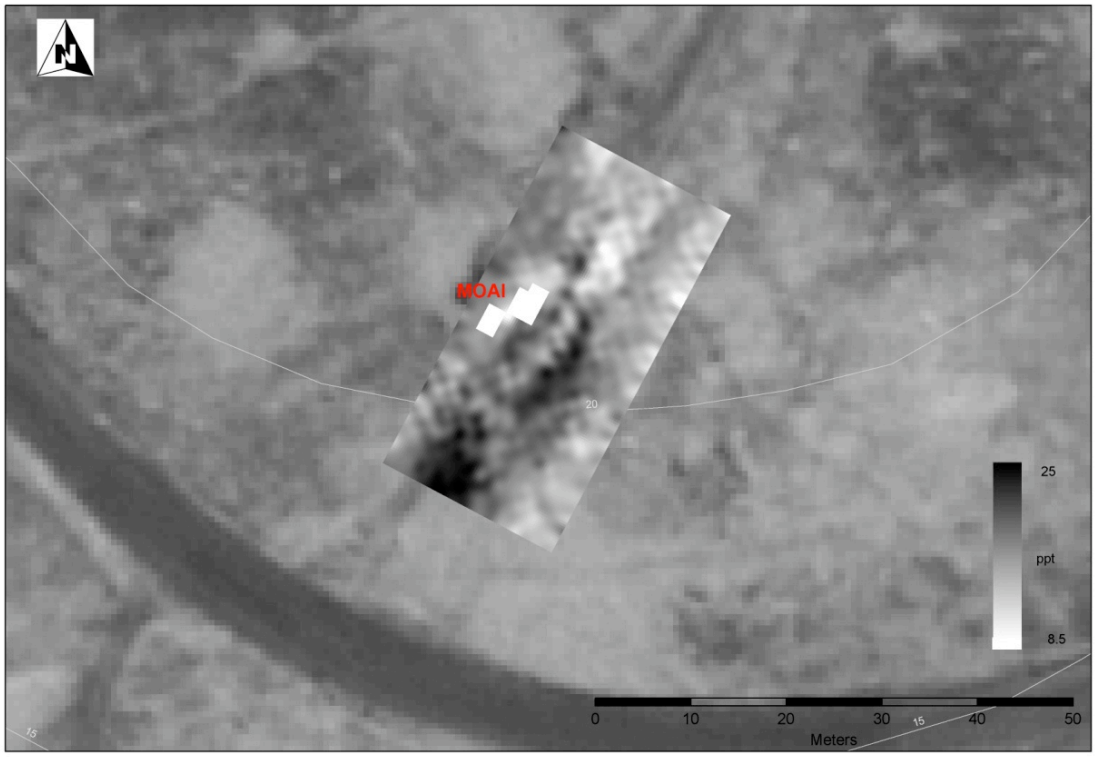
Figure 22.
Plot of geophysical data from north of Ahu Hanga Tetenga

Hanga Tetenga

Survey was conducted adjacent to the *moai* at Hanga Tetenga (LOC survey no 117) where a trackway (the possible *Ara Moai*) can be seen running northwards from the junction with the modern road (*Figure 21*). Electroconductivity survey was conducted in both horizontal and vertical modes. The results can be seen in Figures 22 and 23. A linear anomaly is clearly visible in these data which mirrors the trackway running down the hill from the north of the survey past the *moai* and down towards the modern roadway. It can be seen that the shallower, horizontal survey data provides the clearest view of this anomaly. Fluxgate magnetometer survey was not attempted here due to difficult ground conditions.

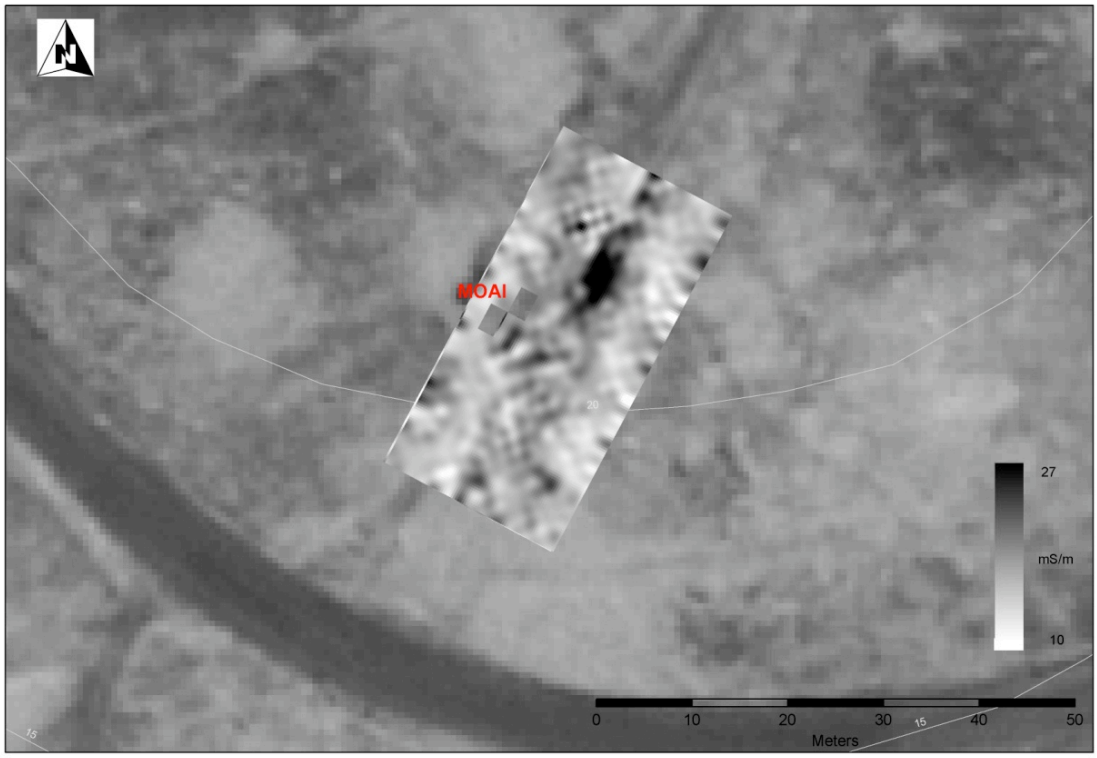
The presence of a stone platform behind this *moai* was identified by earth resistance survey conducted in 2010 (LOC 2012). It is difficult to determine whether this can be seen in the data obtained here, but it is likely that the area of low conductivity immediately behind the statue reflects this feature.

A: Magnetic susceptibility data (horizontal mode)

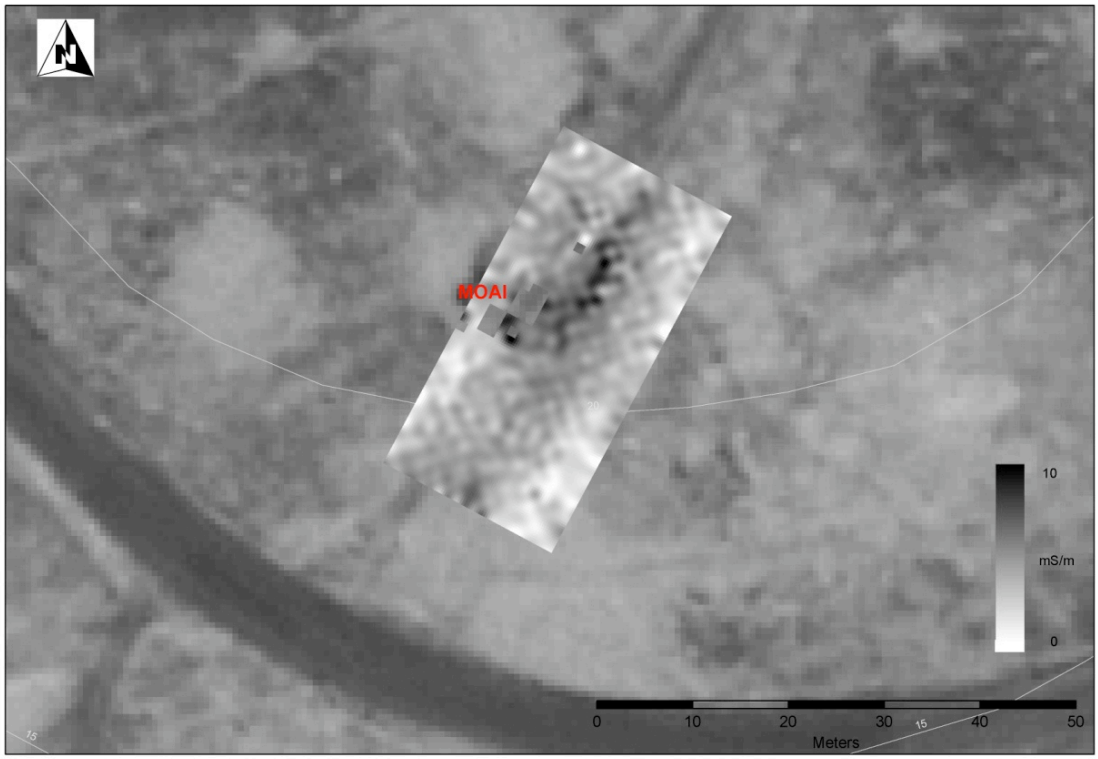


B: Magnetic susceptibility data (vertical mode)

Figure 22.
Plot of Electromagnetic data from Hanga Tetenga: magnetic susceptibility



A: Conductivity data (horizontal mode)



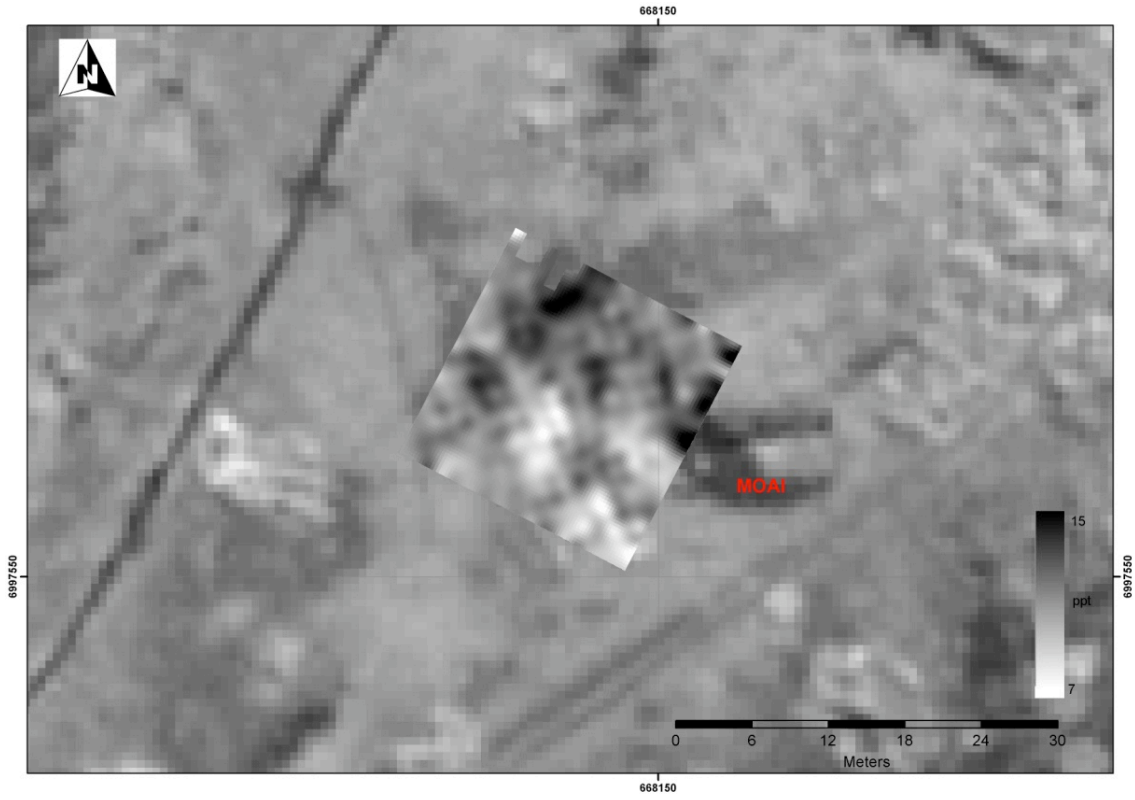
B: Conductivity data (vertical mode)

Figure 23.
Plot of Electromagnetic data from Hanga Tetenga: conductivity

West of Toa Toa

Survey was conducted in the small area of cleared vegetation around the recumbent *moai* to the west of Toa Toa (LOC survey no 115). The results are presented in Figure 24. It is difficult to discern any route way in these data, and it may be that the *Ara Moai* runs along the line of the modern track that can be seen to the south of the statue in the satellite image. A *poro* pavement was present in the grid surveyed. Any remnants of the associated *hare paenga* are difficult to confirm in these data, but a slight trace may be present in the very southern corner of the conductivity data set. This *moai* was not surveyed in 2010 (LOC 2012).

A: Conductivity data (horizontal mode)



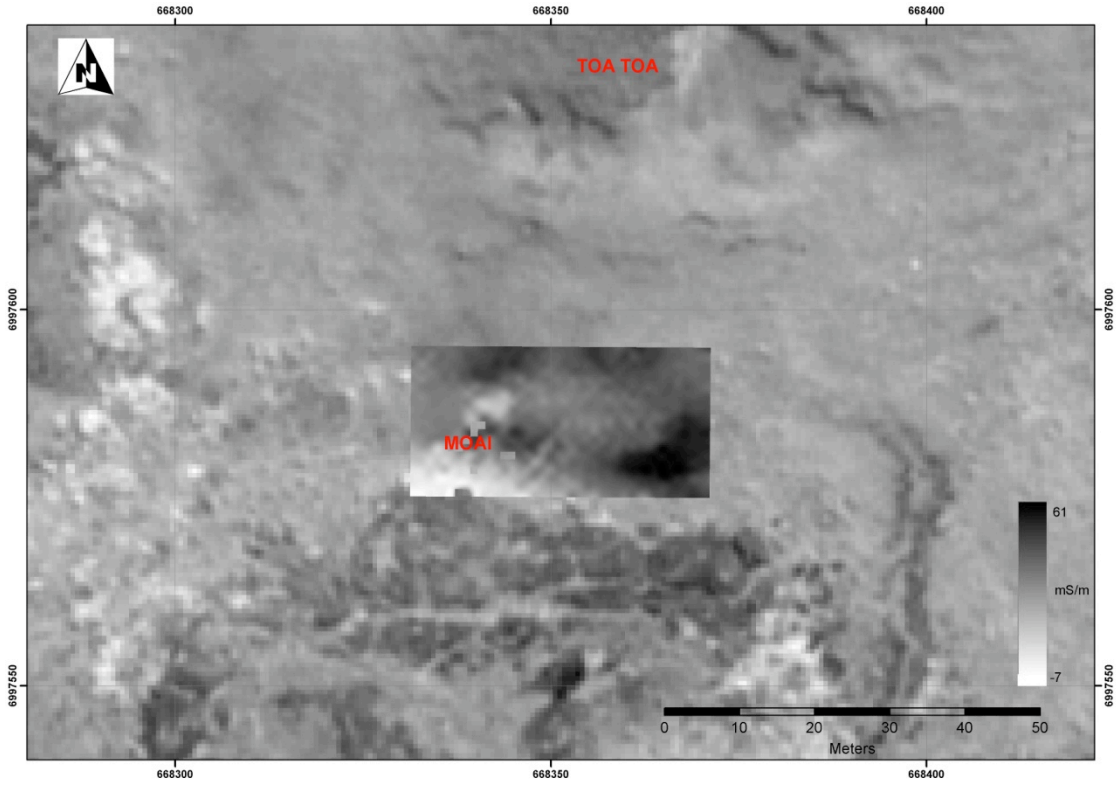
B: Magnetic Susceptibility data (horizontal mode)

Figure 24.
Electroconductivity data from West Toa Toa

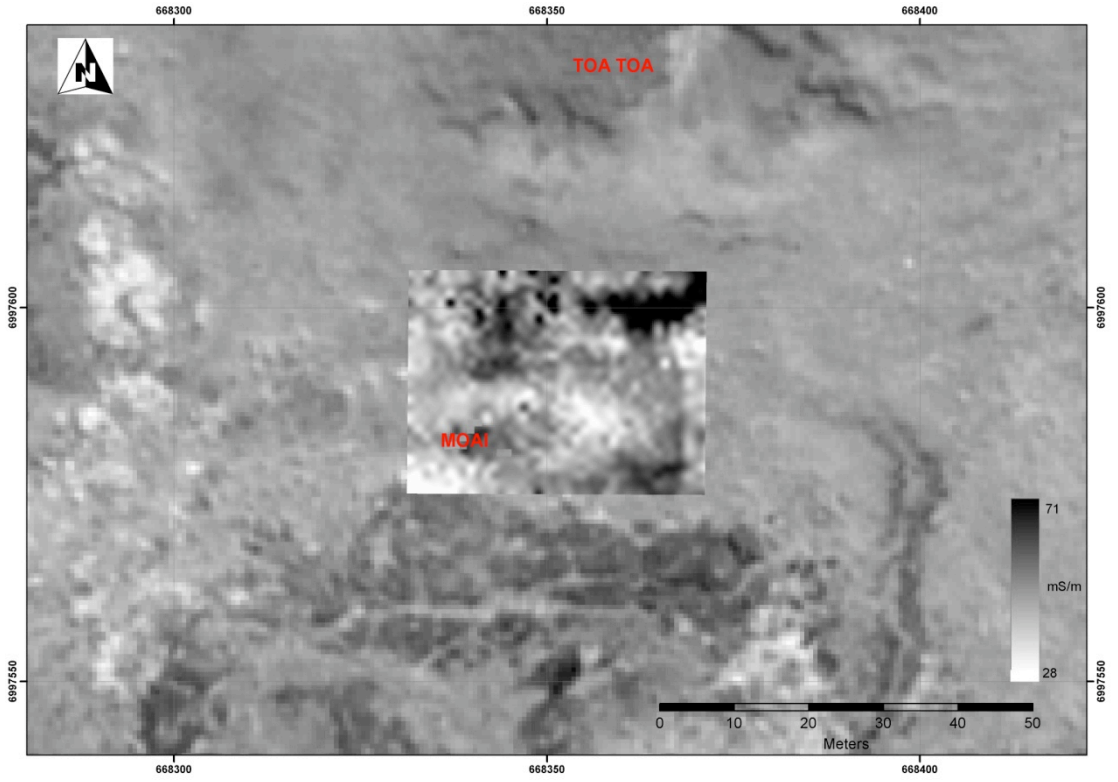
Toa Toa

The survey area at Maunga Toa Toa was situated immediately surrounding the recumbent *moai* at the bottom of the hill (LOC survey no 114). The location of the *Ara Moai* at this point has been under question as mapping by Lipo and Hunt (2005) indicated transit via the north of Toa Toa, although there are no statues in this area. The presence of a recumbent *moai* to the south of Toa Toa has provided the suggestion that the *Ara Moai* may run in an alternative direction. There are no visible tracks present on the modern ground surface to the south of the hill.

The presence of a build up of soil from the hill wash from Toa Toa was thought likely to have occurred over time, and therefore both horizontal and vertical survey was conducted as the depth of any deposits were unknown. The results are presented in Figures 25 and 26. It can be seen that these data do not provide a definitive result for the presence of an *Ara Moai*. There is a sub-linear area of low conductivity that runs west to east above the statue, but this is likely to be related to the shallow changes in geology in this area. It is interesting to note that the stone pad identified behind the *moai* by earth resistivity survey in 2010 (LOC 2012) can be seen clearly, particularly in the conductivity data.

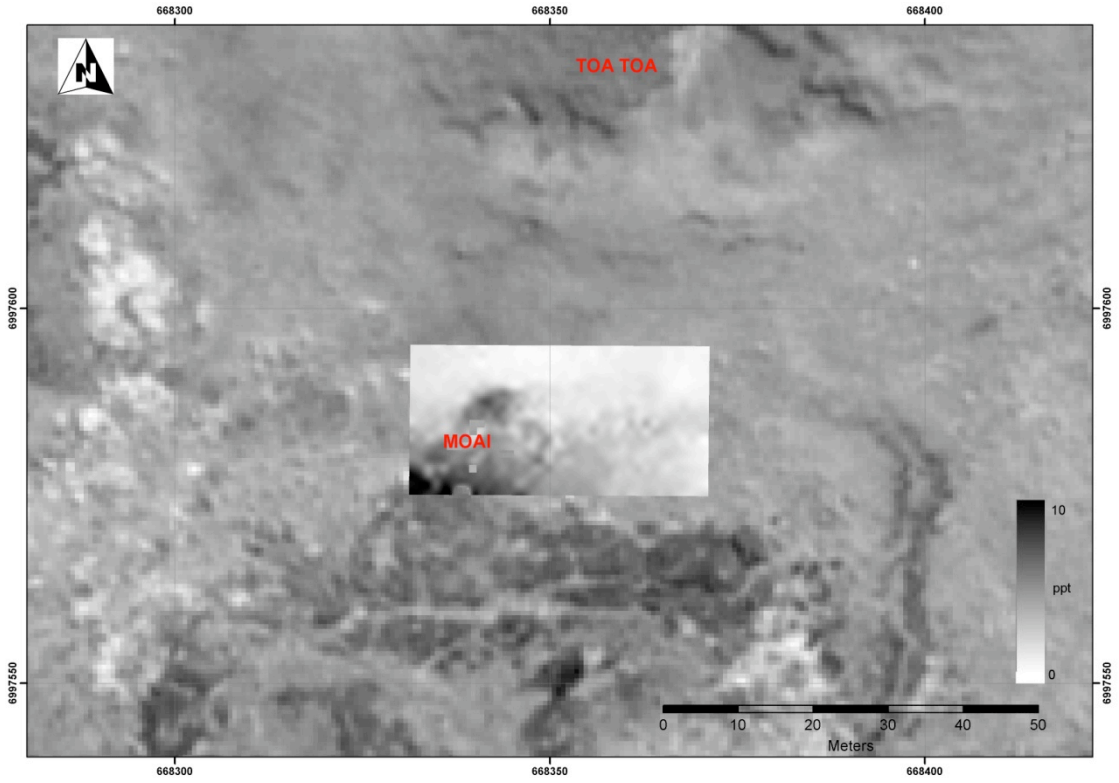


A: Conductivity data (horizontal mode)

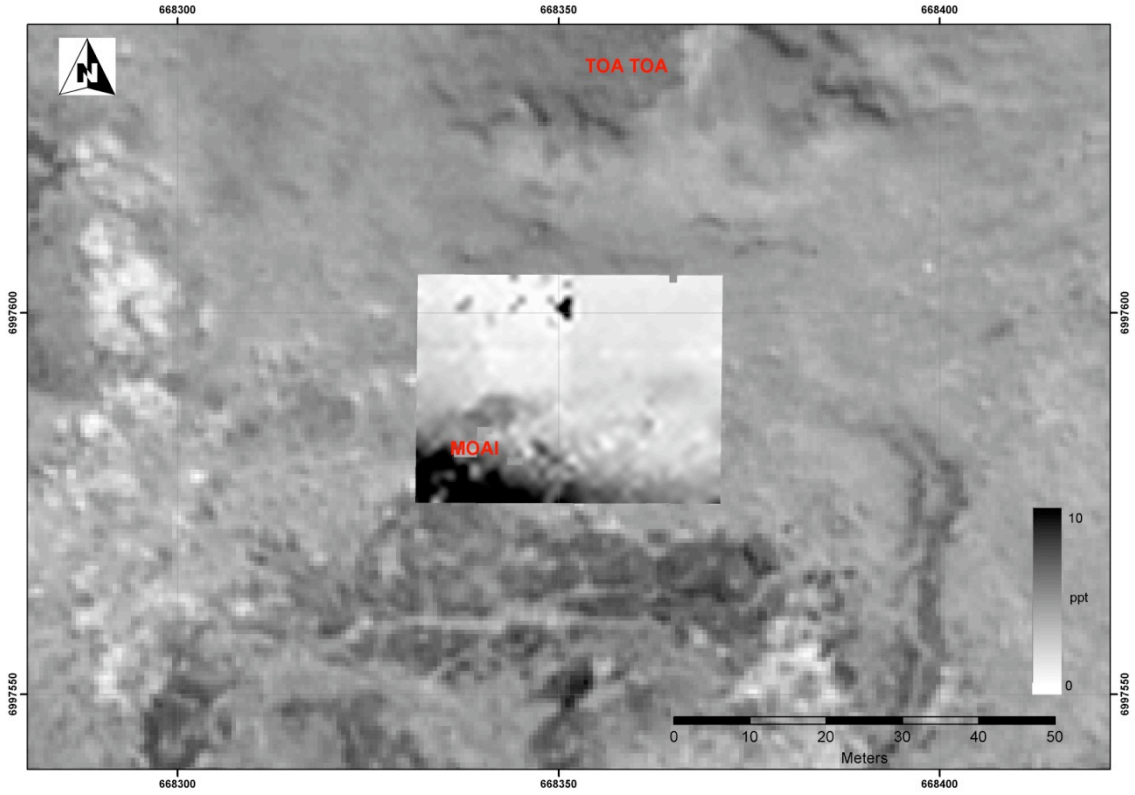


B: Conductivity data (vertical mode)

Figure 25.
Electroconductivity data from Toa Toa



A: Magnetic susceptibility data (horizontal mode)



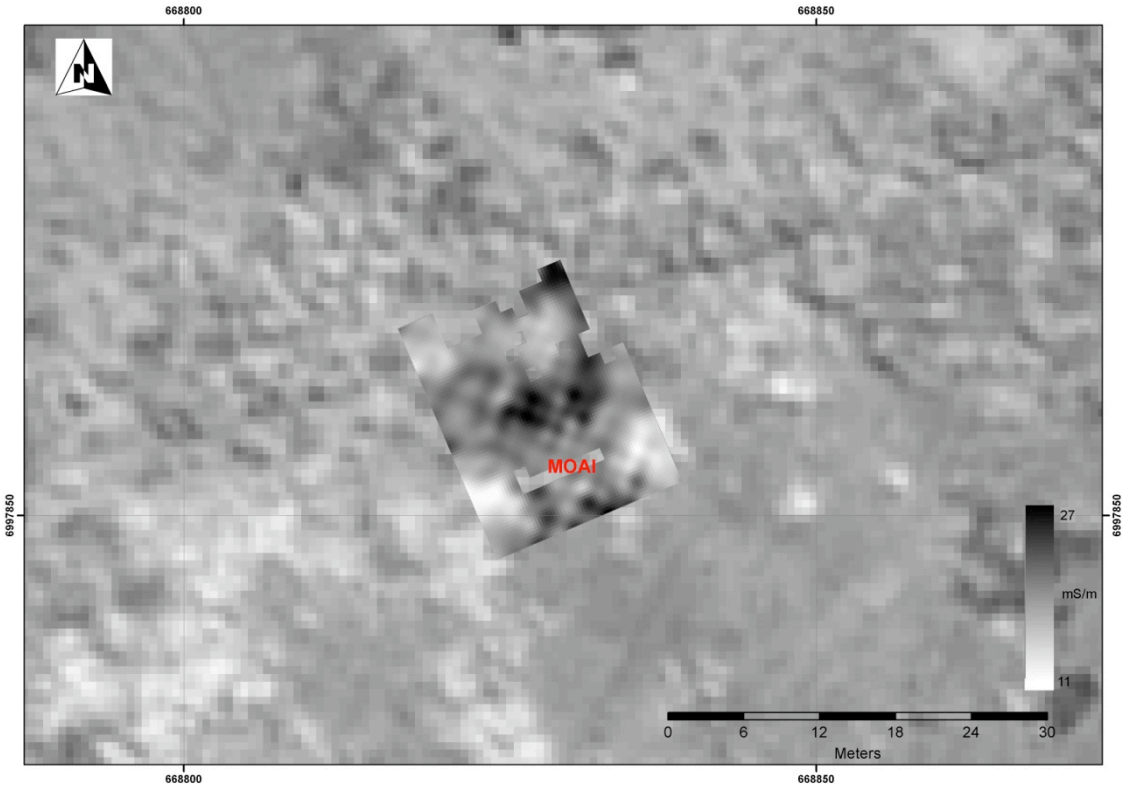
B: Magnetic susceptibility data (vertical mode)

Figure 26.
Electroconductivity data from Toa Toa

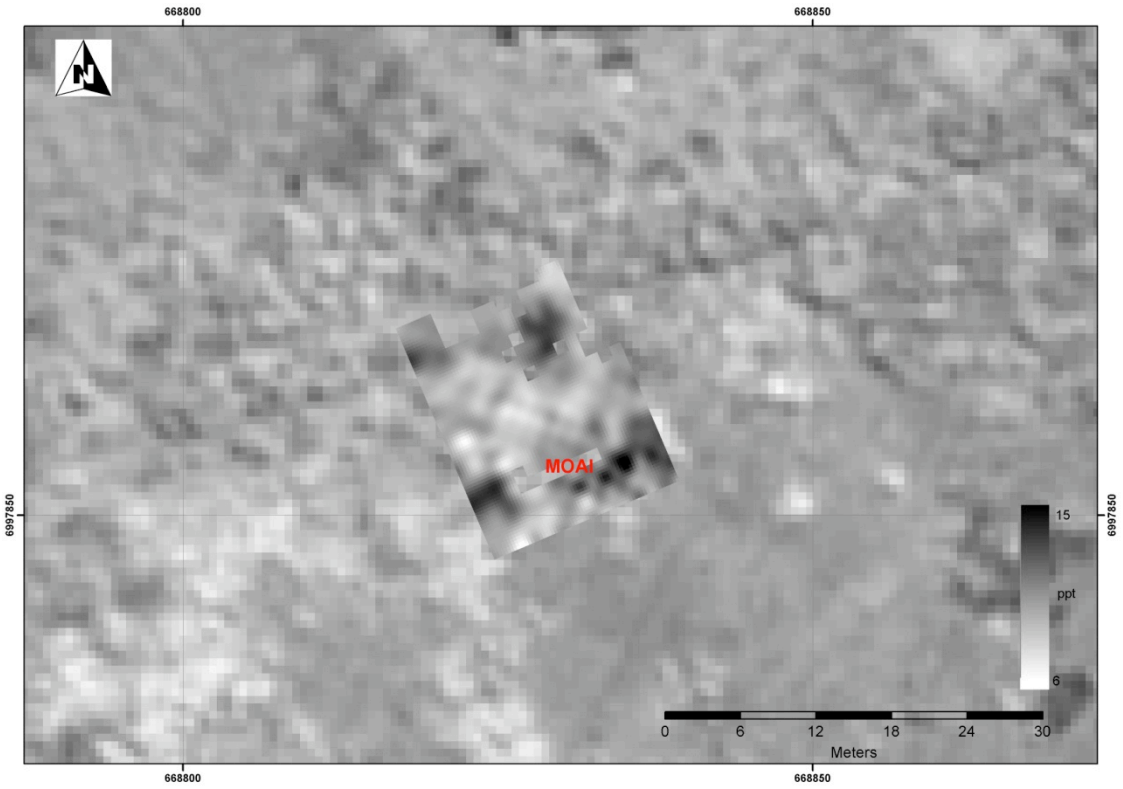
East of Toa Toa

A small area around the recumbent *moai* to the east of Toa Toa was surveyed, as vegetation clearance had enabled the identification of a short line of possible kerbstones, potentially associated with the *Ara Moai*. Survey was extremely difficult in this area due to high vegetation, and the results are reported in Figure 27. It is possible to determine a sub-linear area of low conductivity and high magnetic susceptibility data that runs from west to east to the north of the statue. The small,survey area and ephemeral nature of the anomaly means that it is difficult to ascertain whether this is a product of anthropogenic origin.

A circular pad of stones, approximately 1m to the southeast of the base of the *moai*, was clearly visible on the ground surface. This can be seen as a low conductivity anomaly in the same location with the survey area, and may reflect the presence of a pad of stones behind the *moai* as per LOC 2012.



A: Conductivity data (horizontal mode)



B: Magnetic susceptibility data (horizontal mode)

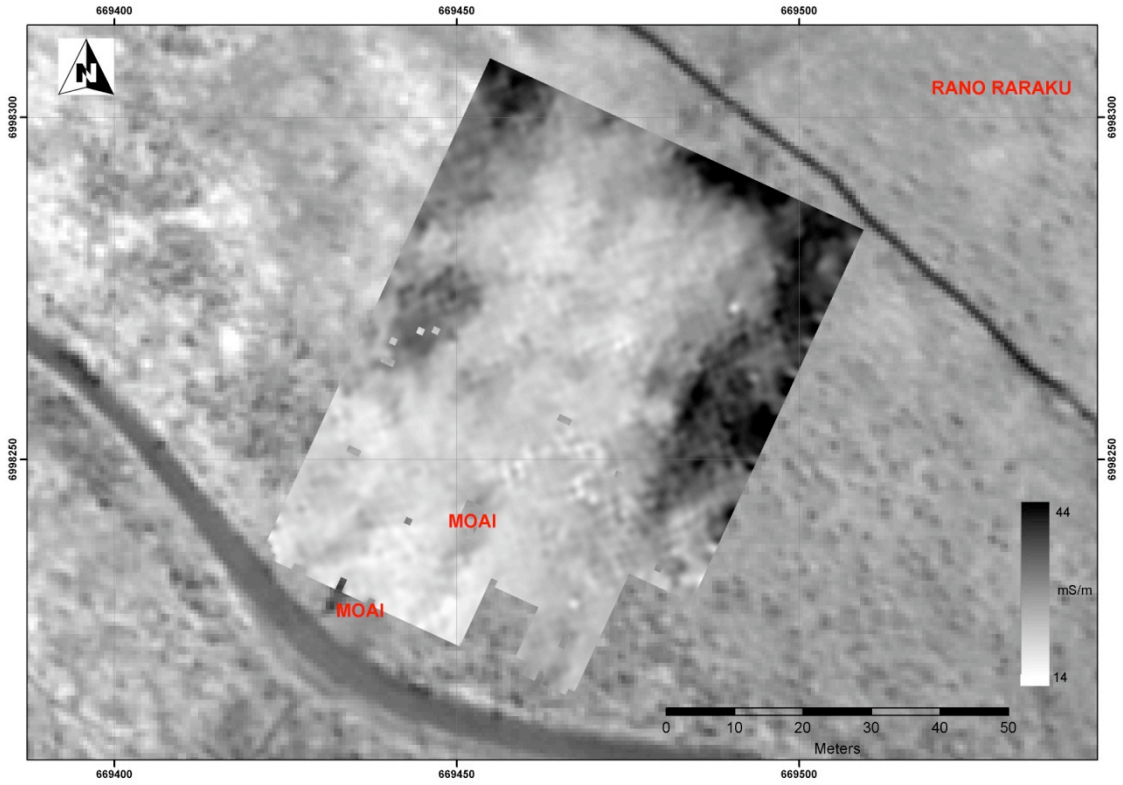
Figure 27.
Electroconductivity data from east of Toa Toa

Rano Raraku

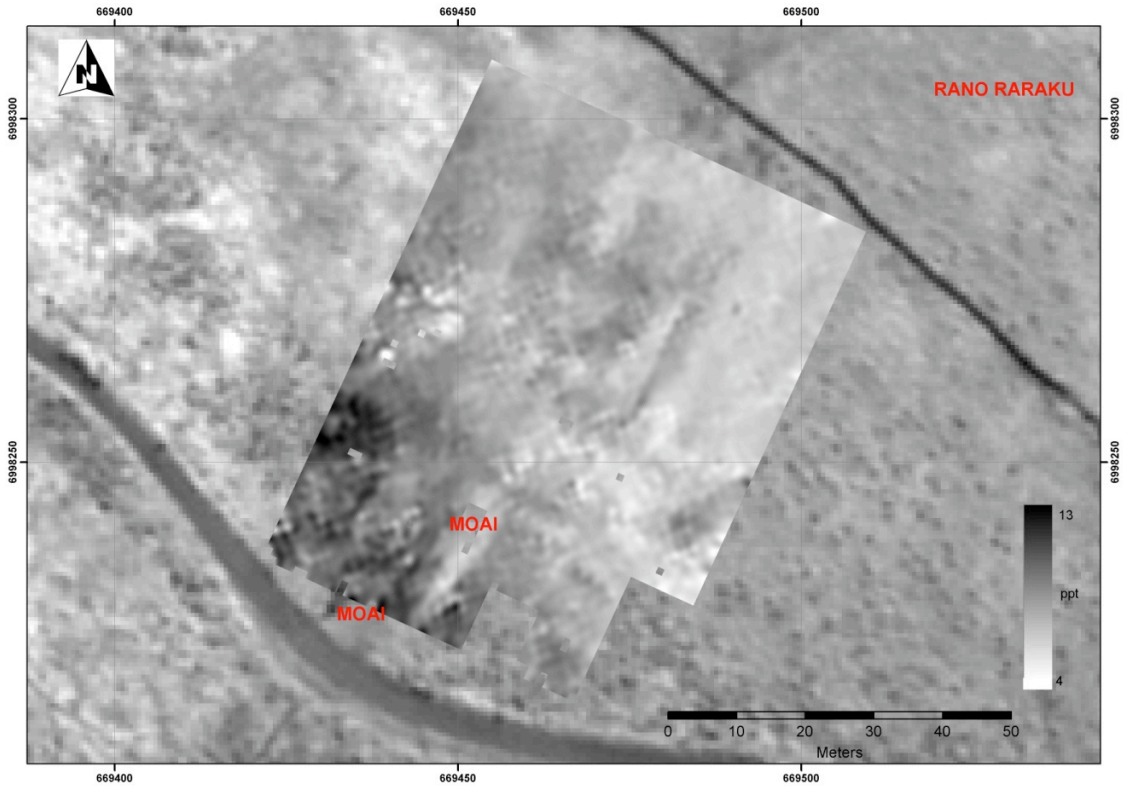
Survey was conducted between the stone boundary wall and the modern road at Rano Raraku. The area includes two *moai*, the one closest to the road having been excavated in 1986 (Heyerdahl 1989). This area was the largest and most vegetation free survey area along the putative *Ara Moai*, and therefore it was possible to conduct both electromagnetic and fluxgate magnetometer survey. The results are presented in Figures 28 and 29.

The results of the fluxgate magnetometer survey do not provide an indication of the location of the *Ara Moai* in this area. However, the results of the electroconductivity survey do show a number of possible anomalies that may be associated with it. During survey, two shallow ridges could be observed running approximately northeast to southwest, *c.* 20m apart from the stone wall outwards to the modern road. These topographic features can be seen as linear features of the same orientation in both the conductivity and magnetic susceptibility data. They run towards the two recumbent *moai* and may be a possible indication of the start of the *Ara Moai*. The ridges may be a function of the presence of shallow bedrock outside of these areas, and it could be frequently observed on the ground surface.

Excavations by Heyerdahl (1989) did not recover any evidence to confirm the presence of a platform behind the statue closest to the main road. In addition, there is no definitive evidence for the presence of a stone platform behind the other *moai* (closest to Rano Raraku) within this data set.



A: Conductivity data (horizontal mode)



B: Magnetic susceptibility data (horizontal mode)

Figure 28.
Electroconductivity data from Rano Raraku

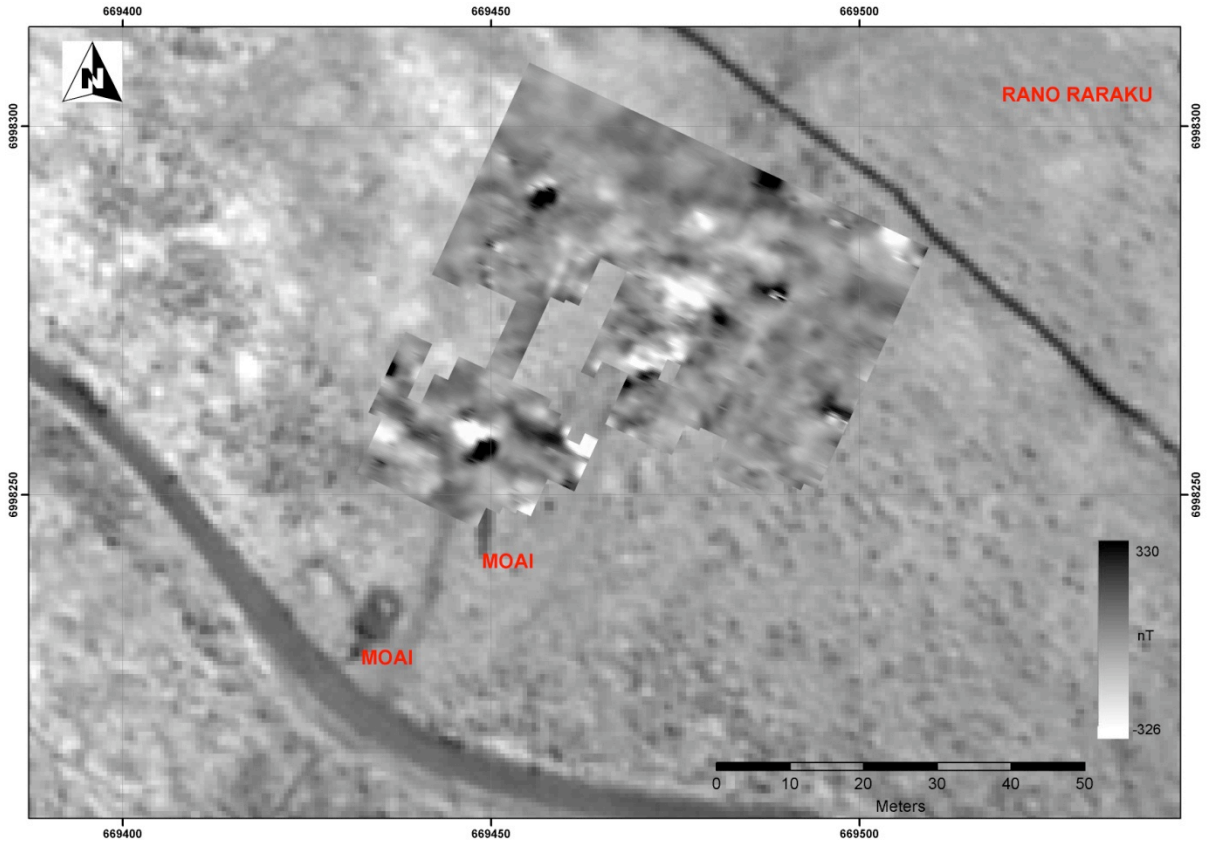


Figure 29.
Fluxgate Magnetometer data from Rano Raraku

Conclusion and further work

The results from this survey have demonstrated that where a possible *Ara Moai* can be observed it is always associated with the presence of a visible topographic feature (usually a modern trackway). It is thought that the nature of the *Ara Moai* is likely to be extremely ephemeral, and this would confirm the observations recorded from excavations (Heyerdahl 1989; Love 2001). It is possible that the use of a different geophysical technique may enable detection of a compacted ground surface, and therefore it is recommended that earth resistivity is conducted over a section of the areas surveyed here to examine this hypothesis.

A number of the stone platforms previously identified by geophysical survey (LOC 2012) were also identified here, but it should be noted that the resolution of this survey was not designed specifically to detect these features.

Despite the lack of confirmed evidence for the presence of the *Ara Moai* in this survey, the use of further geophysical surveys on archaeological sites on Rapa Nui is to be recommended as work at Puna Pau (Welham 2013) has provided considerable detail of the *Ara Pukao*. The non-invasive nature of prospection techniques makes them an ideal tool for use in heritage management, and it is important to establish the extent to which they can identify cultural features on the different geologies of the island.

Surveyors: Adele Caldwell, Lawrence Shaw & Kate Welham

8. Recommendations for conservation priorities for the *Ara Moai*

- The presence of evidence of polish/ smoother surfaces from animals rubbing against the *moai* on the *Ara Moai* is clear, as is the need to protect the statues from human damage. Currently fences enclose four of the statues and in two cases these fences are broken. From the point of view of their preservation, all of these statues should be enclosed.
- Lichen growth is obscuring features on several of the *moai* and its treatment should be considered.
- The recent clearance of scrub in the areas around each statue has revealed interpretatively important features that are in direct association with the statues and also better allowed photographic monitoring of their state of preservation. It should be maintained.
- Larger areas of scrub should be selected for clearance so that the archaeology of the Toa Toa/ Rano Raraku section of the *Ara Moai* route can be better documented and its conservation priorities assessed
- In order to assess the deterioration of the statues, monitoring should be carried out on a regular basis (perhaps every 5 years) — this should be both by completing *moai* observation forms and by repetition of the 3-D photography
- A formal *Ara Moai* trekking route should be established that allows visual access to the *Ara Moai* recumbent *moai* and typical archaeological features along its route. The limits of this path should be defined to avoid the public causing any damage to the wider landscape.
- The proposed trekking path need not and should not follow the entire possible route of the *Ara Moai*, which itself requires protection as an archaeological monument.
- The route of the *Ara Moai* and the nature of the possible statue platforms need further clarification (there are other possible explanations for the structures and geophysical anomalies so far identified) using additional geophysics and selected small-scale excavation. This would better define their needs both interpretatively and in terms of their future preservation.
- In addition to the *Ara Moai* and its statues, Ahu Hanga Tetenga and its associated slipway are in need of protection, since they form an important terminus to one part of the *Ara Moai* and are key to its wider interpretation.
- Ahu Puoko needs to be cleared of scrub/ grass and the nature of its architecture clarified. It is at an important point on the Ara Moai, being adjacent to where the road enters Rano Raraku.

9. Recommendations for presentation to the public

- Rano Raraku's visitor circulation system should to be linked by a sign-posted path to the *Ara Moai.*
- An *Ara Moai* trekking route should form a way of controlling visitors from wandering across the landscape while at the same time providing access to the archaeology of the southwest section of the *Ara Moai* itself.
- The trekking route would be approximately 2km long.
- The trekking route should be designed and sign-posted to allow either starting at Ahu Hanga Tetenga or Rano Raraku.
- Ahu Hanga Tetenga and its 'slipway' should be incorporated into the route.
- Stopping/ information points along the route should be isolated. Stopping points should be at places where there are easily understandable associated archaeological features and where the wider landscape of the route can best be understood. It is suggested that these should include the Toa Toa *hare paenga* (LOC survey no 53) and Ahu Puoko (LOC survey no 98). Both of these are currently overgrown and require some scrub clearance. They are located at key points on the route.
- Well-preserved recumbent *moai*, especially those with readily understandable associated archaeological features should also be highlighted stopping points (e.g. LOC survey nos 91–4 & 104).
- The information concerning possible statue plinths should be presented on boards at the Rano Raraku end and excavation proximate to a recumbent *moai* (e.g. LOC survey no 105) where geophysical prospecting suggests the presence of a plinth) could serve the purpose of revealing an *in situ* statue plinth for presentation to the public.
- Clearance of the scrub and presentation and/ or restoration of some typical features along the *Ara Moai* would widen its interest and educational value. Possibilities for such presentation include the better-preserved complexes of *hare paenga*, *umu*, *manavai* and chicken houses (e.g. LOC survey nos 21–4 and 91–4). Presentation of these structures — aided by an illustrated trekking leaflet, which could be retained by visitors as a souvenir — would enhance an understanding of a range of Rapa Nui's prehistoric structures, give a more rounded picture of the archaeology of the island and provide further variety and interest to trekking along the road.

10. Concluding general recommendations for future work

This is a preliminary light-touch survey for *CONAF* that isolates the potential for a more intensive study. The general focus and requirements of future survey work should be:

- A more detailed study should identify archaeological features and map a wider area beyond the 20m strips either side of the suggested route of the *Ara Moai* in order to contextualize it more fully.
- Following scrub removal, to fill in the survey gaps where current scrub makes survey non-viable.
- To isolate key sites for removal of proximate scrub, possible restoration and display to the public.
- To seek funding for more detailed 3-D monitoring of the *moai*.
- More detailed consideration of the conservation needs of the *moai* that are in the best and worst states (e.g. LOC survey nos 107 & 116 and LOC survey no 162).
- Further geophysical work on the *Ara Moai* to clarify the structure and formality of the route.
- Excavation of a section of the *Ara Moai* in conjunction with an area around a recumbent statue, to better link the archaeology of the two. The selection should be informed by the geophysical surveys undertaken in 2009 and for the current survey.
- Excavation of the area at the back of one or more recumbent *moai* — selected on the basis of the geophysical studies already under taken in 2009 — to clarify the existence of statue plinths.
- More detailed analysis of the weathering patterns on recumbent statues in order to make clear whether *moai* along the *Ara Moai* were standing or not, and if they were, for how long and in what direction they faced.
- Undertaking of a similar multi-scalar study and documentation of another section of the south-west *Ara Moai* for comparative purposes both in terms of conservation and interpretation.

11. Conclusion

The conservation and public access study of the Hanga Tetenga-Rano Raraku section of the southwest *Ara Moai* and its associated archaeological features outlined here shows its great potential for development as a trekking trail that would enhance public/ visitor understanding of the Island's heritage as a whole. A formal trekking trail along this stretch of the *Ara Moai* has the potential *directly* to link the archaeology of Rano Raraku to that of *ahu* by

making a trail from Rano Raraku to Ahu Hanga Tetenga. There is good road access at both ends of this proposed trail. The trail would:

- Present the *moai* in different states and conceptual stages from their quarrying at Rano Raraku, through their movement along the *Ara Moai*, to their setting up in the landscape and/ or on *ahu*.
- Present new research on the nature of the *Ara Moai*'s recumbent *moai*, contrasting the evidence for their in transit abandonment with that for their deliberate setting up as monuments on a ceremonial route (as our research suggests).
- Present typical aspects of the island's wider archaeology — minor quarries, *hare paenga*, *hare moa* (chicken houses), *manavai*, *umu* etc. — in a controlled/ contained context.
- Provide a coherent representation of the island's archaeology *as a whole*.
- Enhance the heritage-related activities that the Island provides.
- Provide an activity that would encourage visitors to stay extra days on the island.

Linking Rano Raraku visitor circulation to the trekking trail could:

- Make use of the visitor facilities provided by Rano Raraku.
- Enhance the visitor experience of Rano Raraku.
- Draw upon the visitor numbers which Rano Raraku already has as, together with Orongo, the most visited heritage location on the Island.

Rano Raraku is a World Heritage site and it is strategic to focus on developing conservation priorities and public presentation strategies from this locale outwards. The suggested trekking trail would be a manageable and effective way of commencing this process.

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Appendix 1: Standard prompt led walkover survey record sheet

LOC — PRELIMINARY WALKOVER SURVEY RECORD SHEET

1. Feature No:		2. Site Name:		2. Associated Feature N$^{o(s)}$:
3. Feature type:				
4. Previously noted (tick)	Hunt:	Atlas:	Shepardson:	Other:
5. Easting		Northing		
6. Length:		7. Width:		8. Height/ Depth:
9. Photo N$^{o(s)}$ (yes/no):				
10. Land use:		11. Physical Relationships:		
12. Description/ Interpretation:				
13. Sketch: N				
14. Significance (*justify*):				
15. Visibility:		16. Date:		17. Initials:
Page 1 of 2				

Feature no:
18. Additional Comments:
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Appendix 2: areas of the survey transect obscured by scrub

Scrub covered/ Open ground	Easting	Northing	North	South
route of *Ara Moai* starts; open ground both sides; then	667226	6997202		
scrub both sides; then	0669409	6998189		
open ground to south only; then	0669344	6998142		
scrub continues both sides; then	0669259	6998072		
briefly open to north; then	0669036	6997981		
scrub continues both sides; then	0669036	6997981		
briefly clear north & south; then	0668969	6997931		
scrub continues both sides; then	0668969	6997931		
briefly open to north only; then	0668858	6997879		
briefly open to south only; then	0668844	6997868		
open ground north & south; then	0668774	6997849		
scrub re-starts both sides; then	0668694	6997838		
briefly open to north; then	0668669	6997831		
scrub continues both sides; then	0668669	6997831		
open ground north & south (the flanks of *M.* Toa Toa); then	0668497	6997720		
scrub re-starts both sides; then	0668322	6997580		
open ground north & south; then	0668162	6997553		
scrub re-starts between route of *Ara Moai* & ranch wall to the north); then	0667998	6997472		
scrub continues both sides (on *Ara Moai* side of ranch wall); then	0667930	6997468		
	0667882	6997470		
open ground north & south; until	0667882	6997470		
route of *Ara Moai* ends	0669451	6998251		

Appendix 3: *Ara Moai* statue 'state of preservation' record sheet

LOC — *ARA MOAI* STATUE STATE OF PRESERVATION

Moai no:	Site Name:	Associated Feature Nos:		
Previously noted (tick)	Atlas:	Hunt:	Shepardson:	Other:
Easting:		Northing:		
Statue height:	Statue width (across base):	Statue thickness (from back to front at girth):		
Photo Nos (yes/no):				
Land use:		Physical relationships:		
Position of statue (tick):		Supine	Prone	On left side	On right side
Description/interpretation:				
Orientation of long axis of statue:		Declination of long axis of statue:	Alignment with *Ara Moai*:	
Direction of geological bedding with relation to the statue's longitudinal axis (tick)	Parallel	Horizontal	At angle	
Date:		Initials:		
Page 1 of 2				

Moai preservation/threats

Nature of damage/threat	Back	Front	Right side	Left side	Base	Top of head
Overall condition (Score 1-4):						
1. Loss of features						
Weather-related damage (Score 1-4)):						
2. Gullying (rainwater etc.)						
3. Stone disintegration						
4. Fissures						
5. Cracks						
6. Fracture						
7. Cavities						
8. Lamination						
Other surface features (Score 1-4):						
9. Silica deposits						
10. Salt efflorescence						
11. Darkening due to humidity						
12. Lichen						
13. Moss						
14. Vegetation						
15. Loose seeds						
16. Bird excrement						
17. Honeycomb						
18. Fire damage						
Livestock/human damage:	Yes/no	Locations on statue				
19. Abrasion						
20. Smoothed/polished areas						
21. Broken off						
22. Graffiti						
Locational characteristics:	Yes/no	Comments				
23. Sedimentation						
24. Marine spray						
25. Exposure to birds						
26. Vulnerability						
Additional comments:						
Key: 1 = none 2 = minor < 33.3% of the visible area 3 = medium 33.3% –66.6% of the visible area 4 = major > 66.6% of the visible area NB in the case of loss of features the score relates to the degree of damage rather than the area covered						
Page 2 of 2						

Appendix 4: *Moai* conservation form terminology

KEY TO CONSERVATION STATUS
CLAVE DEL ESTADO DE CONSERVACION

1 = none= ninguna
2 = minor= menor (< 33.3%)
3 = medium= media (33.3 – 66.6%)
4 = major= mayor (>66.6%)

DEFINITION OF TERMS/ DEFINICION DE TERMINOS

Loss of features:	refers to features of *moai*, sculpted (e.g. eyes, nose, ears, earlobes) or incised (e.g. fingers, belts); also includes later petroglyphs. This field will almost always require additional comments.
Perdida de rasgos:	se refiere a los rasgos esculpidos de los moai (ojos, nariz, orejas, orejeras) o incisiones (dedos, cinturones); también incluye petroglifos posteriors. Este apartado casi siempre requerirá, comentarios adicionales
Signs of erosion *Señales de erosión*	
Gullying: **Erosión por lluvia etc.**	differential weathering of tuff layers resulting from chemical & rainwater action deterioro ambiental de las capas de toba volcánica resultado de la acción química y de la lluvia
Stone disintegration: **Desintegración de la piedra:**	areas of loose small granules of stone áreas de gránulos sueltos de piedra
Fissures: **Fisuras**:	fine surface lines, often forming networks, indicating initial stage of breakdown of stone líneas finas superficiales, a menudo formando redes, indicando el estado inicial de rompimineto de la piedra
Cracks: **Grietas**:	visible opening-up of rock, deeper and wider than fissures aperturas visibles de la roca, más profundas y más anchas que las fisuras
Fractures/breaks: **Fracturas/aberturas**:	stone broken into separate pieces (excluding cases probably caused by damage during original transport or subsequently fall of stone) piedra rota en pedazos separados (excluyendo casos probablemente causados por daño durante el transporte original o caida subsecuente de la piedra)

Cavities: holes or hollows
Cavidades: hoyos or huecos

Lamination: flaking of surface
Delaminación: desprendimiento de la superficie

Other surface features
Otros rasgos de superficie

Silica deposit: whitish zeolite deposit on surface
Depósitos de silice: depósitos blanquecinos de zeolita en la superficie

Salt efflorescence: whitish surface deposit, tastes salty
Eflorescencia Salina: depósitos blanquecinos, con sabor a sal

Darkening due to humidity: darkening of stone surface
Ennegrecimiento por humedad ennegrecimiento de la superficie de la piedra

Fire damage: reddening, soot-soaking, spalling/disaggregation (more than one of these features required to be sure)
Daño debido a fuego: enrojecimiento, ennegrecimiento debido carbón, desintegración (más de uno de estos rasgos para estar seguros)

Lichen: presence of lichen
Líquen: presencia de líquen

Moss: presence of moss
Musgo: presencia de musgo

Vegetation: vegetation growth on or through *moai*
Vegetación: crecimiento de vegetación en o sobre el moai

Loose seeds: loose seeds collecting in hollows and cavities
Semillas sueltas: semillas sueltas que se almacenan en los huecos y cavidades

Bird excrement: presence of bird excrement
Excremento de aves: presencia de excrement de aves

Honeycomb: waxy cellular deposit created by bees
Panal de abejas: depósitos celulares de cera creados por abejas

Livestock/human damage
Daño animal/humano

Abrasion: mechanical damage to surface in localised areas
Abrasión: daño mecánico a la superficie en zonas localizadas

Smoothing: smooth, polished areas
Alisamiento: áreas pulidas, lisas

Breaks: evidence of pieces of stone being broken off
Roturas: evidencia de pedazos rotos de piedra

Graffiti: presence of graffiti
Graffitis: presencia de graffitis

Locational characteristics
Localización de características

Sedimentation: evidence for *moai* being encroached upon or buried by hillwash/soil movement
Sedimentación: evidencia en los moai de haberse sedimentado al haber sido enterrados o por/ el movimiento del suelo

Marine spray: location near coast
Aerosol Marino: localización cerca de la costa

Exposure to birds: location in relation to significant bird concentration. record only if birds observed
Exposición a aves: localización en relación a una concentración significativa de aves. Anotar solo si se observan aves

Vulnerability: refers to vulnerability to damage from visitors and/or animals. Could also include physical vulnerability (e.g. to statue tipping or rolling). This field will almost always require additional comments.
Vulnerabilidad: se refiere a la vulnerabilidad al daño que pueda ser causado por visitantes y/o animales. Puede incluir también vulnerabilidad física (por ejemplo si el moai se localiza en un lugar expuesto, ubicación precaria, etc). Este apartado casi siempre requie re comentarios adicionales.

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